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SEPT. 27, 1954

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NEWS DIGEST



Turboprop Super Connie Goes Aloft

Logged by Lockheed Aircraft Corp. as "the world's fastest passenger delivery transport," here is the new *Navy 2 Super Connie* in the air at the start of its flight-test program. In fact PW&WA T-34 turboprops from Hamilton Standard Turbo-Hydraulic power. Two such will be made for USAF and Navy.

Domestic

Aircraft engine numbers will have a maximum diameter of five feet and will develop 1000 hp at a site of 180,000 bhp to produce 23,000 hp cruise for high speed propulsion, estimates Kenneth Kinstler, manager of American Locomotive Co.'s marine energy department.

These engines for fastship engines, demand and built by the Research and Development Command's Wright Air Development Center at Dayton, are undergoing flight tests on a 500-powered Republic F-84G. The design uses a series of cascades and two reversible bypasses to develop thrust forward.

New landing device that wheels air hoses first against a passenger terminal pier or cargo dock will be tested soon in a pilot installation at New York's Idlewild International Airport. The port will roll onto the Whiting dock, which will raise the aircraft sideways to prevent the landing gear.

Paul cost of Arnold Engineering Development Center, Tullahoma, Tenn., will be \$200 million, estimates Brig Gen Samuel Hwang, Jr., AFDC commander. Cost is for \$139.5 million.

Louis Kennedy, civilian administrative assistant to Sen Nebraska senator and former Washington congressional representative, died. He had been executive assistant to Fred A. Sauer, Assistant Secretary of Defense for Legislative and Public Affairs.

United Airlines DC-7 flew from San Francisco to New York in 5 hr 34

minutes Sept 15, classed as a new record for nonstop transoceanic flights.

John P. Donohue, former traffic manager of the Texas Co., has been appointed coordinator of defense transportation for the Office of Defense Mobilization, responsible for reviewing and developing plans for transportation mobilization in an emergency.

Last PW&WA R4650 to be produced by Pratt & Whitney Co.'s Aircraft Engine Division has rolled off the Chicago assembly line. Total is 1460s 1,079.

Seaboard & Western Airlines Super Constitution landed a 27,018 lb cargo from Hanover, Germany, to New York Sept 17, claimed as a new record for northeast trans-Atlantic commercial flights.

Helicopter passenger service will be started at Cleveland Oct 15 by Cleveland Air Taxi, Inc., formed recently by Kristen G. Bohrer. The new regional taxi and charter company now owns two Bell 47Gs, plans to buy additional aircraft of business class.

Arthur Gadsden, gondola master Mar. 16 for violating flight restrictions at Tewksbury (Mass.) Airport, has been back his pilot's license. The radio and television and planned a flight test in his

Edward G. Saito, manufacturing executive assistant at North American Aviation's Los Angeles plant and former president of the National Association of Purchasing, died Sept 15.

New 85-million terminal will be started next year at Montreal's Dorval International Airport.

Financial

KLM Royal Dutch Airlines has announced with the National City Bank of New York and Chase National Bank of New York the \$5.6-million issuance of a \$7 million loan negotiated in 1952 to back aircraft purchases in the U.S. The original loan was made by the International Bank for Reconstruction and Development.

International

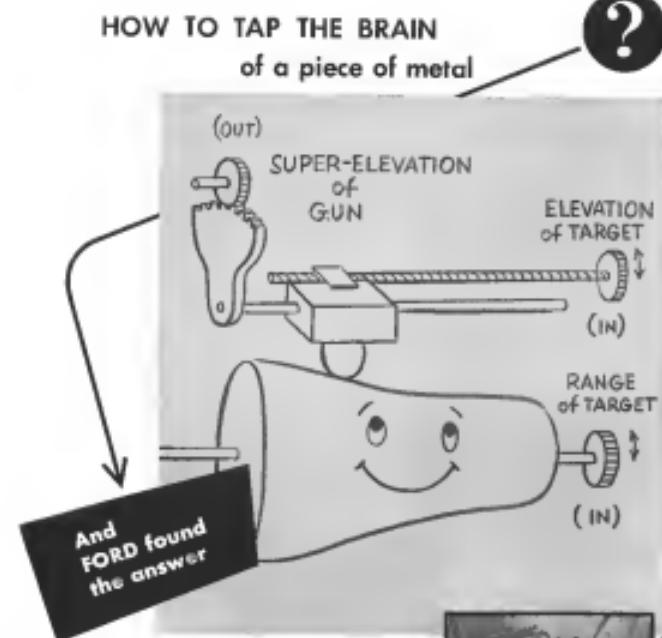
South African Airways has decided to buy three Douglas DC-7Bs, will put the transports on Johannesburg-London flights one after delivery in early 1956. Total cost approximately \$10 million, including spare and radio installations.

Airways expenditures by Royal Canadian Air Force totaled \$143,571,600 during the first quarter of 1956-57, a drop of \$56 million from the same period of 1955-56.

Lagged noontime flight contract awarded by British Air Ministry has been given to Avro, Ltd., independent carrier, following competitive bids. Avro will fly about 7,000 soldiers annually for two and a half years between Britain and Singapore in Bradly Page Herring Comet value \$8.6 million.

New Japanese office has been formed to transport Japanese immigrants to Brazil, according to agents from San Paulo.

New 85-million terminal will be started next year at Montreal's Dorval International Airport.



In making computers, such information as mathematical functions can be stored in a precision-cut cam, thus allowing an follower to be displayed in accurate reply to the input position of the cam. Ford Instrument Company designs and makes cams of all sizes and shapes to achieve these results. To manufacture such cams with the precision demanded, the engineers of Ford Instrument have devised remarkable automatic machines which, by following a carefully plotted ink line on a roll of paper, cut the exact shape into the metal. Then, careful point-to-point checks, sometimes as many as 3000 measurements, assure direct accuracy.

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The Aviation Week

September 27, 1954

Headline News

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AVIATION WEEK, September 27, 1954

DOW CORNING
CORPORATION

Silicone News FOR DESIGN ENGINEERS

Modified Silicone Finish Used On Vehicle Heaters For Its Superior Heat And Salt Spray Resistance

Heaters manufactured for use in Deionized solvents by the Southwest Division of Bausch-Warren Corporation could withstand temperatures far higher than those obtained in aviation applications. In the process of selecting the best finish for these units, the aircraft heat and corrosion resistance of various and modified silicone paints were severely tested. The photograph shows the results.



The black shell at left was sprayed with a standard silicone paint as is found in Bausch's line of Modified Industrial Products and had a temperature rating of 300°F. A similar unit at right was sprayed with a modified silicone paint (CT-500-4000), and baked for 45 minutes at 350°F. Paints in the background illustrate the appearance of both finishes before baking.

Both shells were held at 300°F for 4 hours. The uncoated finish was then exposed to salt spray for 100 hours. The modified silicone finish was similarly exposed to a salt spray for 300 hours or more than 100 times longer. The results were as follows: Bausch heat units with standard black finish and heat shield disintegrated while the silicone-coated material remained virtually unchanged. As a result, Bausch Warren specified the modified silicone finish for all such heaters. No. 1

Despite operating temperatures ranging up to 400°F, the aircraft heater units stay in place without anchoring or bolting, yet 50 pounds of tremie force never causes them to move.

"What's a Silastic?" is the title of a 32-page booklet which answers that often asked question. Indexed and illustrated, the booklet is an informative and informative treatment of Silastic. No. 2

ATLANTA • CHICAGO • CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEW YORK • WASHINGTON, D. C. (Silver Spring, Md.)
Canada: Dow Corning Silicone Ltd., Etobicoke, Ontario. England: Mowbray Silicone Ltd., London. France: S. G. Gobelin, Paris

Miniature Snap-Switch Sealed with Silastic Has Longer Life and Greater Reliability

The Silastic diaphragm resists tensile that the operating force on the actuator need not exceed 12 ounces per sq in.—40°F. Fatigue problems and subsequent unreliable associated with metal diaphragms are eliminated. Operational life in the range of a million cycles is in the range of the best metal diaphragms or bellows.

Accorded permanence, the actuator that the Silastic diaphragm maintains an effective hermetic seal for more than 10 years. Baked temperatures up to 100°C can be held without appreciable loss of strength. No change in the diaphragm has been observed even after 72 hours immersion in oil, fuel, Freon or acids water, or in automotive or AN-06 aircraft fuel.

Originally designed for aircraft, the compact and quiet, miniaturized, the new Silastic switch is being applied to electronic and commercial washing machines, electronic tools and other equipment exposed to liquids or moist air.

That's the kind of performance that has made Silastic an ideal diaphragm material whose precision must be maintained despite temperatures from -100 to 500°F, washing and oxidation, or in contact with a variety of oils and chemicals. Silastic is also unique among resilient dielectric materials because it combines high thermal conductivity with excellent insulation to moisture, corrosion and to fatigue.

For the past six years, Westinghouse Electric Corporation has employed Dow Corning silicone to provide a hermetic seal for its insulation for their electronic insulation. Bausch heat units on the left heat pages. Dow Corning 41 Gristee is also hermetized on the glass plate and back box, as shown in photograph. A Dow Corning fluid, mineral 710R, is applied to the pivot and bearing of the contact motor.

Despite operating temperatures ranging up to 400°F, the aircraft heater units stay in place without anchoring or bolting, yet 50 pounds of tremie force never causes them to move.

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INDUSTRY OBSERVER

► Commercial route an interesting point for license to be used in Capital Airlines' Bell-Rayce Standard Vulcan Vasaire. Rolls and Capital want a 400-ft. limit, while U. S. of course would supply license with a 300-ft. freezing point. Lower freezing point would require importation of fuel to British ports and special handling fees, referred to as trifles.

► Air Transport Asia is disturbed over recent determination of Civil Aviation Administration to be tough sheet metal thickness regulation for jet transports. It gets cause into use without special Civil Aviation Board rules in force. CAA indicates it will make its own rule that a highly cost approach will be used.

► Defense Department is spending in much money on guided missile research and development at it is as plotted missile research and development. Work is under way on at least 28 different models of guided missiles, Aerospace Industries Assoc. reports.

► Pan American Airlines is experimenting with a two-step series of Selen (electro-celling system) to enable an aircraft to acknowledge general distress calls automatically without any action by the crew. Another feature will enable the pilot to broadcast an emergency signal that identifies the troubled aircraft by merely pushing a button.

► First leg of United Air Lines' new VHF communications network between Chicago and Cleveland, which will be owned and operated by American Telephone & Telegraph Co. and leased to UAL, is due to go into operation soon. Next segment, which will connect Boston, New York and Washington, will be tied in shortly afterwards.

► Government will increase its contracts with private firms for manufacture of aircraft to \$625 million in 1955 or about 55% of the total manufacturing costs. Manufacture by private firms has grown rapidly since 1952 when only 25% was handled by commercial companies.

► Bendix Radio has decided to build a C-band radome radar, as well as X-band, following United Air Lines decision to buy a two-mode installation of C-band equipment. UAL expects to begin evaluation tests on RCA and Bendix C-band radars early next year.

► Army recently has discovered effective, if troublesome, way to combat dirt in helicopter engines. Hot and cold air filters will do the job if they are changed twice a day during instant operations off paved landing areas.

► Indications were strong last week that an outside agency, either a utility or a aviation contractor, will get the job of producing the large number of E-345H steel cylinders in months at the company's Farmington, N. Y., plant to bring them up to USMFA acceptance standards. Contracting group has negotiated a 40% reduction in Republic production and long lead to slow accumulation of planes requiring modifications.

► French Eletrocon Corp. has contract to study turbine installation possibilities for the H-21. Walk-Hawk. Contract for construction of prototype will depend on outcome of engineering report to Army Transportation Corps. Turbomeca Ariete 2, used in Sikorsky CH-33 (Aviation Week Sept. 14, p. 17) is only one of several turbine engines being considered. Turbomeca installation would call for four engines to replace present single Wright R-3350-103. Menasco, Navy is reported to order two E-345H prototypes with Wright R1300 engine replacing the Contractual R975-46. Designation would be HU-24.

► United Air Lines and IBM are investigating the use of pushcart computers to record the calendar of transcontinental flight plans. Objective is to allow preparation of half a dozen flight plans in advance, then let pilot select best one for conditions existing at flight time.

WHO'S WHERE

In the Front Office

► Paul Jones, vice chairman of the board of Sverdrup, Inc., will become president of Kaman Aircraft Co., Stamford, Conn., Oct. 1. He will continue to hold his present position at Sverdrup, acting as a managing director and attorney.

► Fred A. Nourse has stepped in managing director of Studebaker-Arthur System, will be succeeded by Horning-Thompson-Hight. Morris Shapley has been elected as joint managing director of the company. He is also managing director of the Studebaker Corp., appointed chief of its Washington, D. C. office, succeeding Colleen Roberts, who resigned this month.

► Edward J. Bonsuji has joined Bremerton Co. at Seattle City Hall, specializing in research and development for West Coast government management.

Changes

► Charles H. Moff is director of Western Home Electric International Co.'s new & future relations department at Pittsburgh, and is also supply manager, marine engine and other electrical division.

► Edward M. Ladd has stepped from Pan American World Airways to join Inter American Air Transport Agency in反射 aircraft offices, with headquarters in New York City.

► K. M. Miller has become assistant general manager of the Research and Development Division of Lear, Inc., Santa Monica.

► Frank S. Ross has been appointed general manager of United Aircraft Products and Materials and Engineering Department, Division of GKN.

► E. D. Burd has been promoted by United Air Lines to superintendent of cargo department, and R. L. Mangold has moved up to manager of cargo sales. L. T. H. Hiltz has been promoted to manager of UAL's engineering and maintenance staff. New manager: F. A. Franklin, air traffic controller. W. H. Pitts has been reelected manager. B. A. Wood, representing pilot members of the union, has been elected A. F. Tanguay, editor. J. A. Aldrich, clerical and instrument. R. U. Farber, steward and stewardess. Charles Pines, equipment and returns. M. N. Taylor, power plant. E. P. Beckford, house service. E. M. Biles is United's new representative of Douglas Aircraft Co.

Honors and Elections

► A. E. Hagen, production manager for Fairchild Engine & Aircraft Corp.'s Engine Division, will be general chairman of the 1955 session of American Engineers Week, New York, April 10-14.

► May K. M. Freeman of Bausch has been elected legal counsel chairwoman of the International Civil Aviation Organization. New vice president, C. G. Conner, has been elected to the International Civil Aviation Organization. W. M. Thompson, president of the International Defense & Equipment Co. of Los Angeles, has been appointed to the California Aviation Commission, succeeding Ed Pfeiffer who resigned.

"Triple Threat"

Chance Vought Aircraft's new F7U-3 Corsair, now coming squadron service with the U. S. Navy, is an outstanding example of versatility and striking power in modern carrier-based jet aircraft. Using a wide variety of armament, Corsairs are designed to fly and fight as interceptors, fighters or attack planes.



Chance Vought Aircraft

BALTIMORE, MARYLAND

INCORPORATED

Tigers Cancel Merger, Quit Airfreight

- Slick Airways will stay in air cargo field.
- But FTL sees profit in plane-leasing business.

Both, Cold-Flying Tiger Line and Slick Airways, are abandoning the airfreight business and ceasing its merger with Slick Airways.

President Robert Fossett says inability of the two lines to carry out labor protective measures imposed on the merger by Civil Aeronautics Board is responsible for the decision.

"Our company has decided to withdraw from the airfreight field and establish new spin-offs in the leasing of equipment and possibly participate in contract flying," Fossett says.

Slick will continue operations as a freight airline.

► **New Slick**—Edwin Routh, former Air chairman and Civil Aeronautics Administrator, and sometime Consumer Undersecretary for Transportation, is expected to be elected chief executive officer of Slick at a board meeting this week, called to set up new corporate structure.

Routh would take over the duties of Thomas L. Gross, president, who is resigning effective Sept. 18.

Joseph F. Gorst, former vice-president and assistant treasurer of Slick, is general manager of the airline under the interim management arrangement.

► **The New Setup**—Under the agreement, Slick will sell its two DC-6As to Flying Tigers for \$3 million, leaving them back to Slick for \$25,000 per month each for six years, or an option to renew for another six years.

Tigers also will sell its one DC-6A to Routh at a monthly rental of \$55,000 for one year. However, Slick has an option, if exercised before Jan. 1, to lease this plane at a rate of \$50,000 per month for three years or for six years at a rate of \$55,000.

Slick also will lease C-46s, now owned and operated by FTL, at a rental of \$1,500 per month for two years.

Flying Tigers' return over nine years on the purchase-money arrangement on the two Slick DC-6As would total \$346 million against the purchase price of \$16 million. On its own DC-6A, the total gross would be \$420,000 for one year.

Proposal Bypasses Labor Problem

The new Slick-Airways-Flying Tiger Line proposal, under which Slick will be the parent airline and FTL the equipment company, appears to come up against the prospect of labor strikes.

An airfreight memo was issued by the 1946 Civil Aeronautics Act that would have the power to put between 15 and 50 million in the pockets of employees, Tigers and Flying.

► **Flying Tiger**—Tiger's memorandum on the issue came August 12. It states one reason, pending Civil Aeronautics Board action, is pending arbitration.

Under the new proposal, FTL will do the same arbitration application. This memo or that of Aug. 13, the airline is not subject to the 1946 Act and its labor strike requirements.

Early CAB action is reported on the new Slick-Airways-Flying Tiger proposal. The two companies claim in their respective letters that the agreement can be put into effect on Oct. 1 or immediately thereafter it cannot be recommended.

A spokesman for Flying Tigers says, "At company employee have agreed to take salary cuts in order to keep the airline flying in the freight business.

over \$1,050,000 for three years, \$1.5 million for six years.

► **Bankruptcy**—Tigers and Slick estimate that the labor provisions of the merger agreement approved by CAB might cost as high as \$6 million and could result in bankruptcy of the merged companies. The two carriers petitioned for relief from these provisions, asking the Board, Air Line Pilots Assn. and Slick International Airlines Assn. to modify the terms. The pilot unions opposed that, while CAB held that full hearings should be held.

The two companies decided to drop the merger rather than become involved in lengthy hearings, which they believed would be held to begin before Jan. 1.

James Conrad Albert, H. Rapier, Jr., Los Angeles, is study the situation earlier this month but opposed the petition for relief (Aviation Week Sept. 16, p. 77).

Rapier and co-defending counsel for CAB were unable to reach a final decision on the proposal but delayed that study of the proposal because of what the labor provisions would cost Flying Tiger-Slick could be forced into a full hearing.

Sossett told reporters that the proposal would not be dropped if CAB did not accept it. "We made up our mind to drop it and that's it."

"We believe our own field offers a more attractive opportunity for us," the FTL executive says. "In fact, the Slick company union was an obstacle in the merger. Relief of the pilots to agree to modification of the labor provisions resulted on the Slick decision to abandon the merger."

► **2,000 Man Layoff**—Aviaphone spokesman says the Tigers' withdrawal from the airfreight business is expected to result in the layoff of some 2,000 employees, although a number of these may be absorbed into Slick's expanded operation.

Both carriers are faced with the problem of working out a combination of backtracking, contracts and other post strike actions in which they had in mind pending final settlement of the merger.

In many cases, as well as in corporate headquarters, the two carriers already had merged their facilities. Since Slick will continue in the freight business, facilities will have to be turned over to that business.

A spokesman for the Flying Tigers says its efforts will result in their own petition, with Fossett as president. The executive staffs of the two carriers had been consolidated at the time the merger took effect.

Routh, who reportedly turned down an offer to take over the presidency of Northwest Orient Airlines, is president of the Texas Auto Transport, Inc., Oklahoma City. A graduate of Texas A&M College, he joined American Airlines as a radio operator in 1941, became president of American Radio Inc., in 1943.

► **Proposed CAA Changes**—CAA Administrator in 1948, CAB chairman two years later and named at Undersecretary of Commerce for Transportation from May 1951 until 1953, when he became vice-president of W. R. Grace & Co. He resigned the latter position shortly after and set up the Oklahoma City company.

FTL will continue its freight operations and Slick is in a position to take over, expected within a few weeks. This will depend upon how quickly CAB acts on the backtracking agreement submitted by Albert.

► **Bank**—Routh, The decision to abandon ended the last transmissional merger over opposed by CAB, was in 1951 after present transcontinental passenger line was established. It also resulted the breakup of the long distance telephone system in the nation, which served 45 states.

Routh told reporters off the record that he would break up the merger and go out of the air freight business before informing the other firms.

"It's family in a question of who or go backtracking," he said. "The problem is to make the unions understand that I am serious about this and not just using it as a threat."

It became apparent to all concerned last week that Fossett meant what he said.

► **Anticipated Move**—CAB moved on its last Monday during the Slick-Tiger period for labor protective pro-



SICK REPLACEMENT Dalmatian

tection changes without a hearing. The action taken by the two freight lines anticipated the Board's move.

In a petition to CAB, the two lines said:

► **In the Interest of the Public**—Under the magnitude of the public liability under their protective provisions included in the Board's order of approval and due to the fact that the Board has not seen fit to modify these provisions by Sept. 15, as requested, your petitioners cannot complete the merger and continue in the airfreight business.

The petition was accompanied by a copy of the agreement reached by the two companies, which took Flying Tigers out of the airfreight business, left Slick the lone transcontinental air cargo carrier.

► **The Petition**—CAB is under pressure to permit the two lines protective changes without a hearing point out that the two airlines said their exposure to claims ranges from \$4.2 million to \$6.1 million, depending upon the manner in which liability for each of the two lines would be apportioned.

They and the "transcontinental cargo liability" would raise the cost of the surviving company, eight flights a day, transcontinental, long-haul, nonstop and could jeopardize arrangements for additional long-haul routes now completed to finance the acquisition of wholly owned equipment.

The two carriers argued that under their proposed modifications in the protective provisions, they would decrease their exposure to claims which range only from \$300,000 to \$300,000.

► **It is Alleged**—that if the proposed modifications are not made or implemented within a few weeks, the public will be exposed to 50% of the design limit.

► **Stability**—After considering the petition, CAB concluded that the relief requested should be denied.

The proposed modifications in the

protective conditions are already in transition to constitute a major revision of the existing conditions. Since these conditions were based upon an industry report after the hearing was adjourned, the Board's action would now be undertaken to complete existing conditions through a temporary procedure.

The proposed changes in the conditions are based upon many conclusions and statements of alleged fact which can not be tested adequately by an adversary hearing, which all interested parties may participate.

CAB said the most fact that companies might be affected adversely by the decision caused by the hearing was that the Board is dissatisfied with the hearing, to the propriety of the other parties to the proceeding.

CAB said it has not been convinced to the problem of the two sub-subs and has study said at all times to lead its members, to the extent consistent with the Board's duties and responsibilities under the Act.

Boeing 707 Starts Buffet Boundary Tests

Boeing Airplane Co. will fly 45 prototype 707 jet transports simultaneously to develop boundaries to determine the aircraft's performance in its initial flight program, interrupted by damage to the transonic assembly Aug. 5 (Aviation Week Aug. 16, p. 577).

During this phase of the 22-hour program, slated to begin next week, the 707 should attain speeds closer to the speed of sound than reached by any transport.

Other characteristics to be investigated by the 707:

► **Rideability**—assessed at the greatest speed possible. The descent rate is expected to be 1,000 ft/min. in a normal climb with an initial and landing gear extended for maximum drag.

► **High speed weight limit**, including full flap with sufficient time to add fuel to the transonic section to 50% of the design limit.

► **Stall**—at transonic conditions.

► **Shakeouts**—of one or more of the four Pratt & Whitney Aircraft JT3 turboprops to determine the lowest speeds that the 707 can be controlled safely under emergency conditions.

► **Seal tests** at extreme control-of-priority limits. Stability and control characteristics will be investigated throughout the 707 range.

During all of its trials, the cabin air-conditioning and pressurization system will be operated.

The 707 has been fitted with a drag chute to test effectiveness of the device. Several minor modifications have been made to the hydrodynamic fairing system

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LOS ANGELES

THE NEW U.S. AIR FORCE

An Appraisal of the Nation's Airpower Program

By Sen. Levenett Soltzson III

My President, Bismarck, wrote in the *Ein Erster Appell* the necessity for steady nerves and the tenacity of the United States to maintain effectiveness in *gewalt*, a leader of the free world. Fundamental to our ability to adopt such attitude and to hold it with firmness and confidence is public understanding of where we are and what we are going. In no field is this more true than that of our national defense. Within that field, public understanding is now more important than with respect to the size and duration of budget of the nation's airpower program.

Now the Defense Department's appropriations bill for the fiscal year 1959 has been enacted into law. I believe this is the first opportunity for a calm and objective appraisal of the present status and future prospects of that program.

But seven years ago, in association with the Senate, I wrote the following 1954 Defense Department Appropriations Bill. I took the time to present my views on the Administration's air program. The last four years much has been done to close the first of the differences between the Air Force budget proposed by President Truman and that proposed by President Eisenhower. Now, a year later, although revision of the Administration's air program appears to have reduced many differences in magnitude

still exist. Let me first state just as emphatically as I can state it that I am first and foremost for a strong and active air force both internally and externally that can protect and maintain our nation's security. Events of the last year have strengthened this conviction. That is why I welcome informed public discussion of the nation's airpower program. That is why I have listened most carefully and attentively to the remarks of my colleagues in the Senate on this subject, and particularly of the Defense Department officials before the Senate Armed Services Committee and the Senate Appropriations Committee.

At no time in the history of this country has the position of airpower been of more direct concern in the overall defense than it is now. All of us, both individuals and corporations, have a very vital stake in the successful solution of this major problem. This is the time for calm and objective discussion, for clear thinking and for considered judgment. Paranoia is a disease should always be avoided. Righteousness is not my purpose in these remarks.

AIRPOWER'S "NEW LOOK"

The most important element in national defense at the time of my speech was the Air Force. This has been reversed. In both military and civilian leaders concerned with our national security, President Eisenhower, in his message transmitting the fiscal year 1955 budget to the Congress, stated very clearly that the budget "pours into the nation's defense...and full exploitation of modern weapons...Our military powers and those of the other nations of the free world agree in the importance of airpower."

Admiral Radford, Chairman of the Joint Chiefs of Staff and in his statement explained the new look. "Today there is no inferior senior military officer as to the major areas of airpower. Offensively, defensively, and in support of other forces, it is a primary requirement. Its strength continues to grow, both through increases in combat air

units and through better equipment."

I do not believe there is any real disagreement in the country as to our airpower objectives. The differences between the proponents and opponents of the Administration's air program appear to lie in the manner in which it is proposed to attain those objectives.

Last year the basic difference was how much money should be appropriated for fiscal year 1954 to meet the needs of the program, based on how much money could which be spent under contract. The ultimate size of the

Vital Airpower Document

ADDITIONAL WORDS concerning airpower today are the new U.S. Air Force with the complete text of the speech addressed by Sen. Levenett Soltzson on Capitol Hill. It is described as a "vital paper" containing the discussion of the Administration's airpower policy, which, it is claimed, shows that the English Administration and military aviation officials colluded with Sen. Soltzson in this official policy and program report. The address, delivered July 28, is the most recent and latest history on U.S. airpower policy since Admiral Burkhardt, chairman of the Joint Chiefs of Staff, announced the so-called "New Look." Sen. Soltzson is chairman of the Senate Armed Services Committee. We believe it is important for our nation to be familiar with such vital and official statements, in order to understand better the week-to-week developments in military aviation and **RHW**

Air Force was not the case, since the 120-wing program was specifically stated to be an interim goal pending a comparison of the entire military situation by the newly appointed Joint Chiefs of Staff.

The report is completed in December of 1957 and the new airpower goals unanimously recommended by the Joint Chiefs were incorporated in the fiscal year 1958 budget. What are these new airpower goals and how will we they provide for the defense of the United States and for our role in the collective defense of the free world?

MARINE, NAVY ROLES

The new airpower program provides for a steady buildup of the Air Force to 157 wings by June 30, 1957, together with necessary support units being built and maintained. It also provides for the continued modernization of our 16 Navy carrier groups. 15 Navy carrier airpower units, including 54 patrol aircraft squadrons, 4 strike, and 4 helicopter airpower units, carrier groups, and 3 Marine air wings, together with their appropriate support elements. It further provides for the continued modernization of the research components of all three of these elements of our military.

All too often in the course of national defense, Naval and Marine aviation are overlooked and ignored, yet in terms of airpower strength our Naval and Marine aviation represent more than one-third of our total air power. Many people would be surprised to learn that as late as June 30, 1953, Naval and Marine aviation reported about the same number of fighter-type aircraft as the Air Force.

Admiral Radford is in agreement before the Senate Appropriations Committee on Mar. 15, put the entire case well when he said: "Some people do not fully comprehend the true importance of today's United States national airpower, and I would like to state unequivocally that it is

superior to that of any other nation. Furthermore, the United States has developed certain segments of its aerospace to a degree far more than a normal carrier striking force which we without peer in this world."

"At the new air program provides for a total of about 49,000 Air Force and Navy aircraft aircraft, an increase of approximately 6,000 over the number on hand at this time. The new program also provides for the continued modernization of this aircraft inventory so that by the end of fiscal year 1957 the entire force will have reached a very high level of modernization."

The new program also places increased emphasis on combatant aircraft. In this connection, the emphasis is to be given to understanding the needs of the 177-wing Air Force program. I have heard a said that in terms of combat wings this program is not the same as the former 145-wing program. This is not the case. The makeup of combat wings is the same, but the composition of the force has been significantly altered. The number of air defense wings has been substantially increased as the new program, and the capabilities of our bomber and tactical wings vastly increased by availability of new weapons.

STEADY BUILDUP

The increased emphasis on air defense does not end with this increase in the number of air defense wings. Major emphasis is also being placed on the ground and naval areas at sea. Not only will the size and scope of our radar defense and early warning system be expanded but the quality and effectiveness of the equipment will be vastly improved as new devices are integrated into this system. All three of the Services have an important part in this vital mission.

As I have stated, the new air program provides for a steady increase in the use and capability of the Air Force. The rate of buildup is slower than that claimed but not as slow as for the original 145-wing program, but it is a rate which is reasonably sure of attainment, one that can be accomplished without reducing the combat readiness of the force in the process, one that can be accomplished efficiently and economically, and one that will result in to maintain a strong aerial maneuverability advantage.

The projected rate of buildup is much faster than the projected rate of buildup in the first 10 years of the original program. This is a matter of military judgment. The completion date for the 177-wing Air Force was unanimously recommended by the Joint Chiefs of Staff and was opposed by President Eisenhower. These are some persons with extensive experience in military affairs who nevertheless feel that the buildup is not fast enough who feel that if necessary we should push the program on a much more rapid rate of rate, regardless of cost, regardless of efficiency and regardless of the effect on our mobilization base.

LONG PULL CONCEPT

This difference in viewpoint is essentially the difference between the long pull concept and the Army's D-Day or "use or perish" concept. The Joint Chiefs of Staff, the National Security Council and the President have decided to give the military forces for the long pull. Since it is impossible to forecast precisely the when and the amount of maximum military danger, it was decided to provide a steady military posture which could be maintained relatively on an extended period of cold war. All have said that this is a matter of military judgment and having heard the arguments pro and con, I take my position with the Joint Chiefs of Staff, the National Security Council and the President.

Apart from the question of military judgment, the long pull concept appears to me to have great advantages over the use-or-perish concept represented by the original 145-

wing Air Force program. It is not generally realized how long and how rapid a buildup the original 145-wing program called for.

The program presented to the Congress in January and February 1952 called for the activation, training, buying and equipping of 96 combat wings by June 30, 1953, 120 combat wings by June 30, 1954, and the full 175 combat wings by June 30, 1955. These combat wings comprise the bombers, fighters and combat reconnaissance elements of the Air Force. The 145-wing program, of course, also included 27 troop carrier wings. All 175 combat wings were to be built, trained, equipped and purchased by June 30, 1955, and fully deployed by Dec. 31, 1955. During the course of time the Air Force was to have rebuilt its aircraft force from practically nothing to a total of 97 wings plus a variety of support units.

In the very first year of the program, the Air Force buildup fell short by one combat wings. Instead of 96 combat wings, the Air Force had only 93, and of these, eight were reported as having a very low degree of combat capability because of extreme shortages of aircraft, other equipment, personnel and other facilities.

When the Air Force came before the Congress last year, the 145-wing program reflected in the Truman budget had already been slowed down. Instead of 175 combat wings by June 30, 1955, the revised program called for 116. The Air Force had already recommended to the fact that it could not meet the original schedule because the aircraft and had cut the June 30, 1954, goal by four combat wings.

But this left a total of 16 new combat wings to be activated, trained, equipped and based in fiscal year 1955 plus some 20 odd combat wings of the existing 90 to be transferred to new equipment and the training and equipping of the eight combat wings carried over from fiscal year 1953 to be completed. In addition, the rebuilding of the Air Force Reserve and the Air National Guard was to be continued at an accelerated rate.

It is difficult for the human to grasp the magnitude of the task represented by these five single numbers and facts. In an effort to provide some basis for comparison, it may be useful to review briefly the aerial experience of the Air Force during the fiscal years 1951 through 1953.

KOREAN INFLUENCE

The Air Force had in being on June 30, 1950, 42 operational combat wings in the regular Air Force and 12 combat wings in the Air National Guard and the Air Reserve. One year later the regular Air Force had 72 combat wings in being and the Air National Guard and Air Reserve only 5 in effect. The slower buildup during fiscal year 1951 was almost completely at the expense of the reserve components.

The numbers of the reserve units, both men and material were shocked by the regular Air Force and reflected in the 50 wing increase which was entered into effect. The next year, fiscal year 1952, the Air Force gained only 5 combat wings, yet in fiscal year 1953, the third year of the Korean buildup, it gained only 10 more, totaling a total of 90 combat wings on June 30, 1953. Of these 90 in June and before, 8 had little or no combat capability.

It may be noted that the Air Force during the entire three year period was engaged in active combat operations in Korea. This does not had some bearing on the slow rate of buildup during that period but only in a limited degree. Combat losses of modern aircraft during the entire Korean war were quite minimal. The fact remains that a large part of the 120 combat wings had to still remain to be accomplished at the beginning of fiscal year 1954.

One very important aspect often overlooked in the discussion of the original 145-wing Air Force program is the effect of the projected rapid buildup on the combat effectiveness of the force as a whole. The situation causing equipping and training of a new wing or the conversion of

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an existing wing to entitle new equipment capacity a tremendous effort and a considerable period of time before the newly activated wing is usually converted wing is brought to a level of full mission effectiveness.

TRAINING PROBLEMS

It may not be generally realized that a new wing cannot be activated outside of a few people. A cadre of trained personnel must be detached from an existing wing to provide the nucleus around which the new wing can be organized, equipped and trained. The withdrawal of these trained cadre from existing wings immediately reduces the combat effectiveness of those wings. The wing losses which the trained cadre is detached from requires a period of time to rebuild before it can regain full combat effectiveness.

We have been told by the Air Force that eight to 12 months are required, on the average, from the time a new wing is activated until it achieves a combat full combat readiness. It may readily be seen that the activation of 36 new wings in a single year, in itself, would have had a major effect on the combat effectiveness of the existing wings.

It is perhaps even less well known that the conversion of an existing wing such as a B-58 to a B-29 wing to racially new equipment such as the B-57 cannot completely eliminates the combat effectiveness of that wing for a period of three to six months and that it requires an 18 new months or longer for that wing to regain full combat readiness.

When the conversion is started, the wing has to be grounded. The schedules are set in the technical training manual to be retained in the new equipment. The conversion of the aircraft may result in extensive retraining, but so too, the electronic equipment. The retraining of the B-47 in many more extensive and complicated than that of the B-29 and B-50. I am relating this last simply to provide some indication of the magnitude of the task involved.

At the same time, the as crews must also be activated to fly the new engines. The B-47 is radically different from the B-29 or B-59 and the familiarization training required is quite extensive. Then, too, the B-47 takes a much smaller crew than the propulsive engine aircraft baseline. This means that each of the crews in a B-47 must master a wide range of knowledge and skill. All of this time and during that time the wing being converted to new equipment has to be grounded.

At the moment proposed are brought together, along with their new equipment, the crews training is commenced. Several months of such training are required before the wing is again operational and combat-effective unit.

It is entirely improbable that the Air Force could have activated, trained, equipped and trained 26 new combat wings and converted to entirely new equipment some 20 old existing combat wings all in a single year. If the attempt had been made, it would have seriously reduced the overall combat effectiveness of the Air Force.

The new 177-wing Air Force program minimizes this threat to the current existence of the force. It allows of control with the new program provides for a steady backlog of up to 10 combat wings each year, fiscal years 1954 through 1957.

This is a rate of buildup which experience indicates is reasonably attainable without causing an imbalance in the Air Force program and without risking the combat effectiveness of the existing force. This realistic rate of buildup will permit the Air Force to properly train, equip and base the new wings as they are activated, and to maintain its combat effectiveness consistently with the increase in number of wings.

QUALITY EMPHASIZED

Another distinct advantage of the new Air Force program

over the old is that it places the emphasis on quality rather than mere quantity. The present planned rate of buildup reduces the pressure for numbers. It informs the person in the Air Force to accept equipment with less than the desired performance characteristics. It provides time for the orderly development, testing, production and integration activities of the latest and most advanced types of equipment. It should do much to eliminate the innumerable rounds of modification of equipment after it is delivered to the Air Force and the extra costs and delays resulting therefrom.

Those of us in this chapter who have been instrumental in our association with superior problems and programs during the last three or four years will immediately recognize the value of the benefits promised by this new approach. For times we have been faced with disappointment, with ship, plane, production problems, delays and with requests for more funds to project the cost of which had exceeded the original estimate. We have approached literally billions of dollars over the last four years of engineering changes to equipment still in production and the modification of equipment already delivered to the service.

I do not say this simply in criticism of the past Air Force. I say, I am well aware that the situation today is quite different from what it was three or four years ago. But our posture posture is very much stronger than it was in the summer of 1950. But I do want to say in the most emphatic manner possible, that the basic way to be for a drastic change in our approach to the problem of building war equipment.

Now that we have observed unusual inquiries which the Chairman of the Joint Chiefs of Staff stated stringent such as required to that of us other nations, there is no excuse to risk the completion of our planned build-up on a credit basis, regardless of the effect on the quality of our equipment.

ECONOMY, EFFICIENCY

This leads me to the third advantage of the new Air Force program as compared with the old. The rate of build-up program in the 177-wing program should be attributable without unnecessary action to improvement. Economy and efficiency need no longer be sacrificed for speed. The Air Force can now conduct an air raid on a rapidly moving target with the consideration for cost. Program elements can be kept below the activation, aircraft efficiency, personnel procurement, personnel training, base construction, etc. Shipments of unutilized elements of the program can be delayed without significant delay to the program as a whole.

The Air Force, in the last case, has been magnificently putting its house in order, continuing its overhauls and reworking of those items which are obsolete or excess to its foreseeable needs, as are the Army and Navy. This task is long enough.

In the procurement effort, the Air Force can now do its contracting on a biannual basis. Negotiations can be completed before contracts are let and money obligated. This should enable the Air Force to obtain better deals for the Government. It will also assure that at the time of the contract are worked out before the Government is obligated, and specifications are available before contracts are signed and production is started.

PROCUREMENT REVISIONS

There is one more important advantage in the new program which I would like to talk about before I leave the subject. The rate of build-up projected in the 177-wing program has permitted an extensive review of the overall procurement program. It has permitted the Air Force to give attention to warplane's capability to produce new jet aircraft and to the very difficult problem of maintaining a vigorous aircraft manufacturing industry.

[Continued on p. 28]

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had the original 147 song Air Force program been possible, an early peak followed by a sudden and steady reduction in aircraft production, to the point of practically closing down the industry, could not have been avoided. Under the new program, the peak has been avoided. Both the industry and the Air Force now have programs planned well into the future which provide for orderly transition from building rates of production to increasing rates of production. It will preserve an industrial base capable of meeting the contingencies of the future.

The maintenance of a steady level of aircraft production is important under

an obvious fact that it is crucial when our combat planes are based on the long pull. In these circumstances we cannot tolerate sharp expansions and contractions in the aircraft manufacturing industry since we have to pull out at full out production at one time along a long period of peace time. It must not stem the fact that by so stabilizing the aircraft industry, influencing the aircraft industry, we are laying the foundation for efficient production and decreasing costs to the Government.

NAVY AND MARINES

In the case of the Navy, although there has been an increase in the number of carrier air groups and intermediate surface patrols, and helicopter squadrons during the last two fiscal years, there has been an increase of 35% in the number of planes on hand with the carrier Air Wings, in the three Marine Air Wings during the same period. The number of combat planes on hand has increased 49 percent.

Equipped with the modernization and re-equipping of combat wings with higher performance type aircraft, the Navy and the Marine Corps have made great progress in increasing the effectiveness of other units, such as the integration of helicopters into assault carrier surface forces, and forces for amphibious assault mounting from Navy aircraft carriers.

Second, large Navy aircraft carriers have been redesigned for more effective anti-submarine warfare, anti-surface aircraft and close air support tasks. These assault carriers provide, by virtue of their speed and size, a more effective anti-submarine weapon than the light-craft class carriers that they replace. By exposing the angle (convex) deck, improved logistic capacity catapulting and stronger plane arresting equipment, they have a capability of operating the newer type of anti-submarine warfare aircraft. Most recently, a new carrier conversion program was initiated to increase the number of aircraft and increased fighter capacity.

By using the single deck for strength reasons, the capacity of the deck for landing aircraft on and off the flight deck is apparently doubled. The angle deck development will also make possible savings of 3 million dollars in the construction cost for each new carrier. These improvements are being incorporated in the new Forrestal class carriers now under construction, and are planned for all new carriers to be constructed.

ACCOMPLISHMENTS

I would like to turn now to the accomplishments of our aerospace program during the last year. Significant program has been made in converting our air forces to jet aircraft. Inventories of jet aircraft have been increased about 50%. During the last 18 months,



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the new increase in total Defense Department aircraft inventories has been more than double that achieved during the previous two-and-a-half year period, from the beginning of Korean hostilities to the end of 1952. Modernization of our air forces has proceeded at a rapid pace.

During World War II, types of Navy and Marine aircraft have been placed by the newest type piston, jet, sleek, stretch and jet fighter aircraft. Many of the World War II Air Force disciplines, except for a few types of B-26s, have been discontinued from the fleet in categories of readiness than it had in March 1953.

fighter, the F-80, has already been discontinued from our inventory. In fact, on June 1, 1953, the Air Defense Command's present fighter inventory, which has been substantially modernized.

Last year I said, "By June 1954, the new budget will produce 114 Air Force wings." Actually, the Air Force had 115 wings activated by June 30, 1954. This is an increase of 12 wings over the 103 on hand in March 1953. All 12 of these are combat wings—bomber, fighters and reconnaissance. By the end of fiscal year 1954, the Air Force had 205 combat wings, the highest category of readiness than it had in March 1953.

ANG. RESERVES

The improvement in the strength of the major Air Forces has been paralleled by a notable improvement in the strength of the Air National Guard and Air Force Reserve. The number of planes in the hands of the combat components of the Air Force has risen from double digits (March 1953) and 44 fighter, light bomber, reconnaissance and transport wings have been organized. Of the Air National Guard's 87 combat squadrons, 62 were partially jet equipped as of May 1, 1954.

The quality of the planes and equipment being made available to the air forces, Air Force, Navy and Marine Corps is also being improved with the increasing availability of modern equipment in the regular forces. The reserve programs of the several military departments, which will be finalized in the funds we have already appropriated for fiscal year 1955, call for improved training of reserve forces and for their closer integration into the overall military plan. The Department of Defense is going substantially increased attention to these programs in fiscal year 1955 and will continue to do so, with the understanding that the most severe element of national defense has a properly organized, adequately trained, and efficiently utilized.

The Armed Services Committee has been conducted an on-the-spot survey of the training activities being carried out under the reserve program and on Jan. 28, 1954, published a report on it. Just as soon as the Department of Defense has completed its recommendations for this program, our Committee will conduct hearings to determine what legislation is necessary or desirable.

In the course of this extensive work, a hearing was held to further develop the problems involved and other aspects of the issue. The facts presented to the Senate by the power sources from Missouri that affect the qualitative aspects of this program. They do not disassociate that less is being done than can possibly be accomplished or emphatically aimed at it least, of course, make public the research that have been originated or programmed for research and development in the field. But I can say and do emphatically assert

The number of wings in the lowest category of readiness was reduced during the year 1953, in order to increase the fighter in this category. In March 1953, strength considerations preclude a more specific statement to the present level of readiness, but I believe the figures I have cited convey the fact that significant progress has been made in increasing the combat effectiveness of the Air Force as well as the mobility of wings.

FLY WEATHER-WISE

[These weather items prepared in consultation with the United States Weather Bureau]

Freeze—Freeze is a light freezing of frost will greatly reduce the airplane's life and general performance. Be sure wings, fuselage, and surfaces are cleaned before commencing take off!



霜冻—Be careful at sunrise, during cold spells in the night of a cold, clear like this when temperatures are below 32°F, especially as it regard of large birds.

Winter Landings—Be prepared for sudden fogging of wind shield when letting down through cloud at even in clear air when moisture content is high. Use same runway, but breaking in no snow.



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AVIATION WEEK, September 29, 1954

35



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- **Excellent power potentials**—outputs from primary battery motor up to 1000 horsepower.
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- **Supreme safety assurance**—signals "Fire On" automatically and responds repeatedly to fire exposure.
- **A minimum stress change**—the single installation—**about 1000 feet of cable**.
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- **Minimum weight**—no special weight in the early design stage.
- **Minimum cost**—no special cost in the early design stage.

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the aircraft has been thoroughly tested and has fully demonstrated its ability to meet service requirements, will provide a repetition of the F-86 type of experience after full production is reached.

Another major accomplishment in developing our revised budgets during the last year has been the complete reorganization of the Air Force budget by Senator of Defense Wilson, in his testimony before the Senate Appropriations Committee on the fiscal year 1955 budget, provided in that there are three distinct methods of achieving economy in military affairs:

First, economy in planning, or, in some call it, economy in forces.

Second, economy in programming, or,

Third, economy in operation.

Programming is the area in which forces, weapon systems and strategy are translated into requirements for manpower, combat material, construction resources etc., which, in turn, determine the amount of money to be spent. Economy in programming is achieved first by providing only the essential activities and programs and by eliminating the extraneous and merely desirable and second, by maintaining flexibility and balance among all activities and programs. New developments, new techniques and innovations in units, training units, operating units, deployment, etc.

OUT OF BALANCE

The Air Force program, by the end of 1952, was really out of balance. The details of that imbalance have already been mentioned previously, but I will not dwell on them now. What I wish to repeat is that major strides have been made within the last year to bring the Air Force program back into balance.

The more recent rate of building provided in the new 1953 long range plan has greatly facilitated the rebalancing of program elements and has greatly enhanced the possibility of keeping the program on balance in the future.

The Air Force personnel, material, and base construction programs have been rebalanced, first to bring them into alignment with the 1947 long range schedule, and second to bring them into alignment with our needs. The results of all these programs rebalanced have apparently created a resulting imbalance in some quarters. It is always that when a program is already seriously out of balance, the only way to rebalance it is to adjust those elements which are out ahead and yield up those which are lagging. This is exactly what the Air Force has been doing during the last year.

The program element which has lagged the most has been base construc-

Announcing— the Royal Gull



an all-new, twin-engine gull-wing amphibian



These Royal Gull's measure 36' 6" over the water. An 8' 6" high wing provides a 10' 6" clearance for water take-offs and landings. The aircraft has a 10' 6" high wing, a 10' 6" high tail, and a 10' 6" high fuselage.

These aircraft have been designed for utility service with the U.S. Army, Air Force, and Navy. They are also suitable for executive, survey, and racing.

They were built by the world famous People & Eel, Inc., of Miami, Florida.

PERFORMANCE DATA AND SPECIFICATIONS

PERFORMANCE DATA AND SPECIFICATIONS	
POWER PLANT	
Overall length	36' 6"
Wing span	40' 6"
Height	10' 6"
Wing area	264 sq. ft.
Empty weight	3900 lbs.
Max. useful load	1740 lbs.
Gross weight	5640 lbs.

Engines: Lycoming GO-430

125 h.p. each. Maximum continuous power, 140 h.p.

Altitude: 10,000 ft. 100 m.p.h.

Rate of climb: 1000 ft. per min.

Take-off run, land

Landings run, land

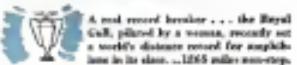
Time for takeoff from water (no wind)

18 sec.

HERE'S a working ship that's specially designed for the man who's going places. Be he a single-minded executive, serial surveyor or company pilot, he'll go "skyside and landside" in the exciting new Royal Gull.

If you're that man, this amphibian puts new, more useful wings at your command . . . provides conveniences unthinkable in any other type of aircraft. Go when you want . . . it speeds up to three miles per minute. Fly where you will . . . in 5-place executive comfort up to a thousand miles or more. Land where you please . . . any airport, lake or river can be your landing field.

Learn more about this new concept in utility and convenience. Write on company letterhead for your copy of the 16-page brochure on the Royal Gull.



A real record breaker . . . the Royal Gull, piloted by a woman, recently set a world's distance record for amphibious land in its class—1265 miles non-stop.

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The airplane you see is a prototype model, built to prove forward flight on jets, and to demonstrate the advantages of its advanced design. Faster than any previous aircraft to fly more than 100 mph, it can span the continent in five hours. The Atlantic is seven.

In a similar version, the new Boeing will be able to accompany jet bombers and fighters on their missions and return them on flight to their most efficient speeds and altitudes. And as a medium transport, it will provide a vital personnel and cargo supply line, geared to the speed requirements of all jet military operations.

The new jet— to be known as the Stratojet or in military configuration as the Stratofighter—is in its own initial research—now undergoing intensive flight tests at Seattle. These tests will enable Boeing to prove out

BOEING

A major effort has been made and is continuing to bring that program about the new 177-winged liquid jet airplane. The new aircraft will be that can be advantageously used. The adjustment on the fuselage build-up will greatly facilitate the proper location of seats as they are mounted and made ready to function.

RESHUFFLE

A very extensive re-arranging of personnel has been required to bring the test-flight program into balance with the other major program elements and the new 177 wing build-up. This has involved the modification or cancellation of some aircraft contracts and the cancellation or replacement of numerous contracts for aircraft components and other major programs.

During the first 10 months of fiscal year 1954 the Air Force has obligated \$1,800 million in the Aerospace and Related Procurement Appropriations alone, and for the year as a whole disbursements may total \$2 billion. These obligations, in general, reflect a commitment of appropriations in the light of more stringent standards of need or more recent operating experience. For example, increased engine life expectancies and the creation of combat space above the Air Force's original 1950 contract of about \$500 million worth of engines and engine parts.

The cancellation of the T-33 trainer contract produced a de-obligation of about \$120 million. The reduction in the heavy plane program resulted in the de-obligation of about \$52 million, and so forth.

This re-arranging of procurement was also required by the inauguration of the new Air Force Financial Purchasing Policy which is designed to time the placing of follow-on contracts as to the planned procurement production while at the same time holding down the further accumulation of unfilled orders on the books of manufacturers.

FLEXIBILITY

This is one of several actions taken by the Air Force to place its buying operations on a more businesslike basis. By letting new contracts at the latest possible time, without resorting right in the production line, the Air Force retains maximum flexibility in its procurement program. More time is usually available to make changes in the program as the need to do so presents. Furthermore, this policy provides a much-needed incentive for the contractors to meet their production schedules. No new contracts will be placed with a manufacturer until he has satisfactorily performed on the contracts he already has.

This appears to us to be a very sound business practice. The inaugura-

Valve Talk
by W.M. R. WHITTAKER, CO., LTD.
by Martin Whittaker,
Senior Member, Aviation Writers Assn.

How about the engineers?

Not the department chiefs, but all the slide rule experts who— in anonymity—help create new aircraft, then take a quiet back seat to the planes, the test and the test pilots.

Invariably the chief engineer is credited with a new design, and because he pushes himself into the publicity spotlight, but honestly it would be impossible for a newspaper or even a magazine to give credit to everyone who has a share in a development. So the top man is automatically chosen to represent engineering.

Yet behind him are hundreds of men who do the necessary basic work and fight out the myriad individual problems to solution that result finally in the completed airplane.

What kind of men are they? When first they're dedicated to their work, probably by selection as most able, most learned, most willing and accepting of challenges.

And by large, they're creative, independent thinkers and these often provide a certain measure of risk-taking for the industry, some large, some small, but all that is welcome, since development is a gamble.

However, they are not to be quite classified, performing the company and understanding of other engineers. Is that it has been reported they play bridge with their peers? There's no doubt they are conservatives as a class, and yet they are willing to take risks, to take a chance, to take a position and assume a position that they derive in engineering problems.

In the industry's present shape, aircraft engineers form the greatest segment. There are little developments work, and hence no need for many new titles, but there would transfer them to a blueprint.

But with the expansion of jet power and speed demands for speed, skills and intensity—particularly in the one-field—the engineers found themselves more and more divided.

So now, in a new world today, for instance, the test engineer of an aircraft becomes an jet fighter can no longer easily or more comfortably make his living at the design of a World War II combat plane.

The average engineer has four years of college training and follows through with eight years of field experience to have an ultimate interest of the problems that confront him. Obviously he

starts as layout work, progresses to drafting and engineer classifications and from there to lead men, group engineer, design specialist, and engineer in charge of project, research and project design—a long list of all kinds of work.

And he might work on any one of several diverse items from aerodynamics to navigation, from power plants to structures, structures, test, etc.

Unfortunately the measure of his success is not the number of aircraft he designs nor does he earn more medals and new awards. As an engine, field, test, and personnel designer, success is brief, often with permanent.

Individual aircraft engineers are not too concerned with public credit. They dismiss the legends as far as the technical and operational are concerned. They'd rather see the progress of their engineers and the industry as a whole, and not the public credit. And the final record of the public credit, as in the case of these programs, is rather success.

But stand—ahem—on more serious, more critical requirements more serious problems.

And the aircraft engineer requires a family training the recognition by his peers, he will realize the value that goes with it, such as better salary and better working conditions, even to specifically designed buildings for his comfort and safety. He's not easily satisfied and there's no in fact no further success about something desired but has skills.

Whittaker takes his hat off to those men who are the gods of finance, managing companies and smaller manufacturing concerns, etc. Without them there would be no aircraft industry.

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—Metric Motor Driven**
Output: 112, 25 and 52 G.P.M. at 6, 12 and 18 R.P.M.
Duty: 32.5 R.P.M. continuous
Relief valve: 500

**Submerged Fuel Boost Pump
with By-Pass and Relief**
Duty: 14.5 R.P.M. continuous
Output: 30 G.P.M. min.
Discharge Pressure: 10 P.S.I.G.

**Engine-Driven Fuel Boost Pump
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Adjustable By-Pass Valve**
Start Speed: 3400 R.P.M.
Flow: 142 G.P.M. max. at 10 P.S.I. fuel pump.

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only, to reduce the rate of war obligations, but it has not reduced the rate of production. The placing of follow-on contracts earlier than required to maintain uninterrupted production merely increases the industry's backlog of un-filled orders and not the number of aircraft and other material delivered to the Air Force.

The small amount of Air Force obligations for aircraft and related procurements over during the first ten months of fiscal year 1984 has given us no real indication of corporate and consumer Let us note, however, that the fact that big backlog does not imply a delay in currently programmed aircraft deliveries. Neither does it result in a decline in future aircraft deliveries.

OBIGATIONS

There are a number of very cogent reasons why Air Force obligations for aircraft and related procurement were so small during the first 10 months of the fiscal year.

First of all, the only obligation figures regularly compiled by the Services are obligations that are fiscal year obligations, less de-obligations. In fiscal year 1984, the Air Force estimates that approximately \$1.7 billion of aircraft funds were obligated. Since de-obligations of fiscal year were about \$1.5 billion, net obligations amounted to only \$1.7 billion.

Second, the Air Force has been making an intensive effort to get its procurement programs on a sound cost-effect basis, to eliminate programs which have been criticized by the Congress and the General Accounting Office and, in general, to introduce more sensible, more pragmatic procurement. Many of the actions taken in this effort, such as the revised purchasing policy which I have already discussed, have had the effect of temporarily postponing the placing of new contracts and in some cases causing the de-obligation of funds.

The Air Force has just completed a rather detailed audit of the factors contributing to the delay in placing obligations for the first year 1984. The net obligated balance in the Aircraft and Related Procurement appropriation at the end of that fiscal year is now estimated to be \$4.59 billion. Of this, \$1.65 million is accounted for obligations against the fiscal year 1983 program. The balance, \$3.64 billion, represents funds which were originally planned for obligation in fiscal year 1984 and which are still required for fiscal year 1984 and prior year programs.

The study indicates that about two-thirds of this "unplanned" unobligated balance of \$3.645 billion as of June 30, 1984, is attributable to two factors, the first being a "planning" problem, to which I will get advanced in the second year space procurement policy which I shall discuss in a moment. The fact that these

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highly automated unobligated at the end of the fiscal year should occur no later than after their obligation to fiscal year 1954 was not required under the new procurement policies.

SPARES POLICY

With respect to the spares policy, it had been the practice of the Air Force in the past to include in aircraft contracts a lump sum amount to cover the total estimated cost of future engineering changes, spare parts, training equipment, special spares, etc.

The General Accounting Office pointed out that the contracted payments made up these lump sum amounts did not indicate performance by the contractor but required independent action by the Government contracting office, when the requirements for engineering changes, spares, etc., were finally determined.

In effect, these lump sum amounts resulted in obligations were not a true liability of the United States Government and, therefore, were not true obligations.

The new policy discontinues that practice. Funds for engineering changes will not be obligated until the contractor has been paid for and charged by the Air Force. Spare parts charges will not be obligated until the spare parts requirements have been discontinued both in its strain and quantities and placed on order.

The net effect of this action was to reduce the amount of new obligations in fiscal year 1954 below the original estimate which included this type of spare obligation. The same policy is solved in the disobligation of \$100 million of the \$2 billion held during fiscal year 1953 representing the reduction in disallowance of spare charges for which delivery date of items to be procured were not available.

Again I want to point out that this move however, practice will not in any way delay the actual production of spare parts at the introduction of new engineering changes.

CONTRACTING

Another new policy introduced by the Air Force when the letter price clause was eliminated made the placing of contracts with contractors where contract modifications or price reduction clauses in part due to existing contract. This action was taken to provide an incentive to both the Air Force being personnel and the contractors to bring up to date all contracts on which poor performance or contract final status were disallowed, another measure reinforced by the General Accounting Office.

This action also contributed to the reduction in new obligations during fiscal year 1954, but it was not allowed to delay production. Now that some

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Liquid to liquid H&D heat exchanger combination. Main Fuel Heat Exchanger U-615150 located in tandem with the U-615150 Afterburner Fuel Heat Exchanger function to cool engine lubricating oil. UMAP series, mounted on each exchanger, incorporates maximum fuel temperature limiting control and cold start oil surge pressure relief.



These H&D heat exchangers are unique in that they are extremely small and compact. Low oil pressure drop. Applications: 3000-6000 psi at 100% test oil temperature.

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delays have been eliminated, the placement of new contracts are governed on schedule.

I was pleased to note in the Air Force study that 900 million of the amount de-obligated in the aircraft procurement during fiscal year 1954 was the result of such price reductions.

LETTER CONTRACTS

The Air Force, in the past year, has greatly reduced the use of letter contracts for the procurement of aircraft and other major items of equipment. Financial contracts are now the rule and the letter contract is used only in

exceptional cases. This is as it should be. The letter contract was never intended in Government procurement as a substitute for a fixed contract. It is to be used only in exceptional cases and in times of emergency. Where used, it is to be replaced at the earliest possible time by a definite contract.

The Air Force has been working up on the use of letter contracts and, as a member, I have served in review, temporarily, the obligation of aircraft funds. The Air Force buyer must now complete his contract negotiations, including specifications and all other terms of the agreement, before the money is obligated rather than after, to

the time when a letter contract is used.

I feel confident that in the long run that return to fixed contracts practice will speed up the procurement of aircraft and other aircraft equipment rather than delay it. Since the Government and the contractor will know how long the contract will take to stand and the possibility for non-delivery and disputes will be reduced.

One final point on this subject. Perhaps the Air Force Department through another military department will no longer be reported as obligating until the funds are actually placed on contract and the Government incurs a liability. This change in policy has been introduced in the recent reductions in the rate of obligating.

It is estimated in the Air Force study that funds of the "unadjusted" obligation balance of \$469 million in the major procurement account on June 30, 1954, represented Air Force purchases uncommitted to one of the other services but had yet reported back as being placed on contract.

NET OBLIGATIONS

I believe it is quite clear that the relatively low level of the Air Force net obligation for aircraft and related procurement during the first part of the past three years reflects, essentially, the introduction of many basic aircraft buying priorities in Air Force procurement. Now that the transition to the new procurement guided rules has been substantially completed, the rate of obligating is beginning to rise sharply.

Net obligation of aircraft funds in May, \$450 million, was 20 percent higher than the total net obligation in the last 14 months of fiscal year 1954. These figures are not yet available but the Air Force estimates that net obligation of aircraft funds in June will be approximately \$500 million, twice the May figure.

The adjustments in procurement priorities and improvements in procurement procedures, which I have described, have not, and will not, delay the 337 wing build up. Indeed, I am firmly convinced that the seven wings in the last year will assure the success of final accomplishment of that goal.

PERSONNEL

Great progress has also been made by the Air Force during the last year in reducing its military personnel requirements. Personnel requirements have gone down a very marked percentage. The Air Force now feels it can meet the new 337 wing program with 97,000 military personnel. Two years ago the Air Force stated to the Congress that it would require 1,218,000 military personnel to meet a slightly larger force of 345 wings.

The reduction in military personnel



Aircraft hydraulic and mechanical controls by *Sargent*

Sargent has been building dependable hydraulic and mechanical controls since 1930. Today, leading builder of military and commercial aircraft requires Sargent's dedicated responsibility in research, engineering and manufacture as the standard of excellence for the production of these controls.

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Weight of this receiver is less than 2 oz.—torque exceeds 1,300 mg cm/degree—accuracy 30 minutes, total error span. Used in conjunction with a Clifton transducer, overall system errors of less than 40 minutes span— ± 30 minutes approximately—can be anticipated.

The same engineering team that developed the original 1 43/8" diameter high precision synchro units already available on a production basis have high output high accuracy transducer-receiver combinations at a savings of almost two-thirds the weight.

For full information on these and other units of this complete series of high accuracy Sinc #30, Sinc #31 and Sinc #35 units, write or telephone T. W. Shoop, Sales Manager, MAP 6-6331 (Suburban Philadelphia).

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impedance has been achieved without detracting from the combat effectiveness of the Air Force. Reductions have been made in many of the areas repeatedly criticized by the Congress—Air Force bases, air ports, headquarters personnel, training personnel, military personnel in jobs which can be done by civilians, etc.

With respect to the last item, the Air Force "Native Son Project" alone promises ultimately to reduce military personnel requirements by some 43,000. More than two-thirds of this reduction has already been realized. It is planned also to extend this concept to the Continental United States by substituting civilians for military personnel in areas where such interchange is feasible and economical.

The early release of men, whose terms of contract were clear to the employer, and the early release of personnel, together with the early release of their sum of marginal value to the service, has placed the Air Force in a much better position to meet the large-scale turnover anticipated in fiscal year 1955. The Air Force, however, still faces a very difficult recruiting problem.

The end fiscal year 1955 goal is 970,000 men, an increase of 20,000. Because of the very high number of resignations expected in fiscal year 1955, this net gain of 20,000 men will be achieved with a major recruiting effort. To assist the Air Force in meeting this problem, the Secretary of Defense has recently authorized a separate recruiting service for the Air Force. The Defense Department feels that the greater emphasis being placed on manpower resources must be maintained.

TRIBUTES

Mr. President, the last year has been a trying period for the military and civilian leaders of our Defense Department. I cannot close my remarks without paying strict tribute to the patience, courage and devotion to the utmost interest demonstrated by these men and their associates in the Pentagon and in the field commands.

The Air Force has been engaged in a rigorous reorganization of all parties of its personnel, and, in addition, drastic changes are in progress of defense resources. These changes are now removing the shackled budget of the Air Force personnel. The new program is being pushed with a vigor and determination which is certain to insure its success.

The new training and procurement policies are being rapidly implemented and logically supported from top to bottom by the Defense organization. The people of this country have every reason to feel secure in the knowledge that our Nation's defense is in good hands.



COHRLASTIC PYLON HEATERS GUARD AGAINST ICE



... provide all-weather protection for the F-89D

Pylon fuel tanks along the lower wing surfaces of the U.S. Air Force's Northrop Superfort F-89D increase its range without appreciably affecting speed. In order to prevent or remove ice accumulations on the leading edge of the pylons, COHRLASTIC Heaters presenting multiple wattage densities for variations in heat distribution to required areas were designed, in cooperation with Northrop Aircraft, Inc., engineered and produced on complete assemblies by the Connecticut Heat Rubber Company.

Special riffling on rubber heating blankets is interlocked between aluminum covers were performed and utilized to encapsulate assemblies. No damage to the airfoil shape of the pylons was required because the outer surface of these light-weight, compact and

rugged heaters provides the shielded surface.

All COHRLASTIC Heaters meet MIL and AFM specifications. They are easy to install, easy to control, and can be adopted to any size and shape. The unique construction features enable these heaters to provide uniform heat distribution for extended durations over large or small surfaces. COHRLASTIC Heaters operate trouble-free in temperatures that range from -100°F to $+500^{\circ}\text{F}$.

Perhaps, Calculating electro-thermal methods of protection can be applied with advantage to preventing your serious icing problems in transportation areas. Our field engineers are available for direct contact. Call or write today.

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Theodor von Kármán (left) DAF chairman, and Guido von Pirquet



Richard F. Gomperts (left) and David C. Rausch, U. S. delegates at IAF congress.



Hermann Oberth (left), pioneer rocket pioneer, and IAF president Paul Dostál.

Space Flight Needs Only Money, Time

By Frederick C. Dostál, III

Berchtesgaden, Austria—The feasibility of space flight is no longer a topic for academic debate, but a matter of time, money and program.

In these words we summed the theme of the fifth annual Congress of the International Astronautical Federation (IAF), recently concluded here. Data given from rocket and aerospace societies of 37 countries, representing 7,600 professional level members pointed out that the borders of space flight are being pushed. They said that the first man-made transoceanic satellite vehicle would be merely an extrapolation in magnitude of current high-altitude and high-speed rocket powered flight.

And they stand that progress in research and development on sounding rockets and orbital vehicles and flight in rocket-powered aircraft has benefited substantially greatly because of the many problems to be solved.

► **Who Was There?**—A cross-section of the scientific, technically oriented aerospace, chemical, flight, aerospace physicists and rocket engineers, space scientists in communication, plasma, materials, aero and thermodynamics.

The importance of aeronautics at top professional levels has evolved only in the past several years. Not long ago, few scientists in rocket engineers would speak openly on the subject of space flight. If they did they had to go to meeting places from their own countries and to the offices of the *"Aerospace Engineers."*

And they stand that progress in

research and development activities is significant that such publications consist now as USAF Space Advisory Board chairman Prof. Theodor von Kármán, and NASA director Dr. Hugh L. Dryden attended the Congress. Both von Kármán and Prof. Hermann Oberth, pioneer rocket pioneer, addressed the session.

Oberth in attendance was a notable figure from the early history of the new science. Prof. Hermann Oberth, Juan Gómez van Piquot, Dr. Eugen Sänger and Prof. Rolf Engel Gómez and van Piquot wrote the detailed classical theory of space flight as far back in 30 years ago, setting out the concepts of step rockets and satellite vehicles and pointing out their importance. Sänger and his co-workers at the Institute of Space Research at the University of Tübingen, Germany, and Prof. Dr. Franz Böckelmann a professor of aeronautics, presented a paper on rocket technology for the end of World War II. Engel was one of the first initiators of the original German rocket society.

Delegates of Venezuela, we saw, Dr. Gustavo V. Zárate was also present with their former commanding general, Dr. Walter Dorowenger, now general.

Frederick C. Dostál, III, was elected president of the International Astronautical Federation for the fifth annual congress. Now a consulting engineer of Washington, D. C., he was an engineer with Bell Aircraft Corp.'s rocket group (1947-61) and an engineering fellow for the U. S. Naval Air Rocket Test Station at Down, N. J. (1955-58). His earlier experience in studies for and a half year in USN aviation research has been spending through military re-

search and development activities.

► **Technical Session**—During the technical sessions, 32 papers were presented in English, German and French. The wide range of subjects considered for the session emphasized the complexity and the high scientific level of information.

For example, given on a subject of space medicine with emphasis on cosmic radiation hazards, high temperature resistant materials, theories of combustion, guidance and control, orbital flight systems, analytical statistical design calculations, aerodynamics, heating problems, propagation systems and reviews of astronomical programs.

Some writers considered practical topics, and others considered basic theory or proposed their thinking 20 to 50 years in the future.

Of particular interest to many observers was a talk shown of U. S. French and German German developments. The French coverage included short of solid motor development at Vienna and test flights of the Véronique at Colombey-Bechar, French Massene. Véronique is a sounding rocket similar in design to the Aerobee but with an ingenious mechanism system for initial stabilizations (Aviation Week, April 5, p. 38). According to Prof. E. Verner of Paris, the Véronique reached an altitude of 54 miles earlier this year.

Summaries

Of the many papers presented, these few have been selected for summarizing a typical cross-section of IAF scientific papers:

- **High-Temperature-Resistant Structural Materials**—By R. Kehler and F. Dennerlein, Fließerei Berlin.
- An examination of current problems

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assures instant response in remote systems



Bendix-Pacifica Self-Displacing Accumulators can eliminate unnecessary tankage at remote installations and in fixed terrain control systems.

Its Accumulator, intermediate fluid chambers and double plenums caused by a piston and half the unit operates as a conventional accumulator while the second half acts as a displacement tank.



For economy limited hydraulic systems which require lengthy delivery to remote oil fields, the problems of dead time, long lines and high pressure drop at remote sites can seriously limit system performance. The Bendix-Pacifica Self-Displacing Accumulator, instead of dissipating a portion of the system's energy in the conventional way resulting in high fluid velocity and pressure drop, uses a unique design that permits the system to function at minimum dead time and frictional resistance.



One of the unique Bendix-Pacifica Self-Displacing Accumulators has been designed to reduce the dead time of the system to one-tenth of the time of the conventional system. This is accomplished through the fluid system which is divided into two separate sections, the first section being constant dead time.



In systems where dead time which permits the system to respond to the start of the system function, the Bendix-Pacifica Self-Displacing Accumulator can reduce dead time to one-tenth of the time of the conventional system.



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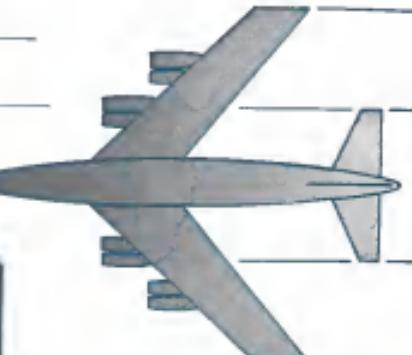
Saginaw offers multiple circuits...

and multiple circuits in ball bearing screws offer multiple advantages



- **less weight** In a Saginaw Ball Bearing Screw more ball carriers in share of the load. No balls "go along for the ride", simply as spacers. Thus, far fewer balls are required and therefore a substantially shorter, smaller and lighter nut is necessary to contain the balls for a given load.
- **greater capacity** Conversely, a nut of a given length is capable of carrying a substantially greater load than those of other designs. Thus, either way, a Saginaw Screw is advantageous.
- **increased efficiency** Because with multiple circuits, no more than 2H turns for each circuit are required, the balls operate with greater fluidity—and maximum efficiency.
- **ensured safety** In the rare event of a ball failure, in a multiple-circuit Saginaw Screw, only one circuit is inactivated, and the other circuits "carry on".
- **experience for you** The Saginaw Steering Gear Division pioneered in the development of the retarding ball-nut screw. The continuous research and development of the engineering staff is available to help you increase the dependability and efficiency of the actuators in your product, and to cooperate with you on any new applications you may have.

Saginaw Screws can be supplied in 1, 2, or 3 circuits and in a complete range of load and life requirements for use with electrical, hydraulic or pneumatic units. Write today for our free engineering data book.



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Cramped quarters don't cramp the style of ADVANCE rugged and reliable You can use them on loads up to 5000 pounds continuously, and at three times their rating intermittently—with complete reliability. ADVANCE load and vibration—stand up under temperature extremes. You'll find them readily adaptable in any mounting need—a any type of duty. Here are a few examples:

"TINY MITE"

JAN B. MCPHERSON

This photo shows the tiny "mice" engine designed to fit in extremely tight spaces. It's made under vibration and shock—plus a variety of temperatures and pressures in a few seconds. Output rating is 100 rpm at 1000 rpm.

MANUFACTURE THREE-PIECE TYPE HO-MOTOR

Only 94 cu. inches in size, yet this tiny unit can develop loads of over 1000 pounds up to 4000 RPM. Microscopic in size, it's built to withstand extremely high temperatures, vibration or shock. It's made under vibration and shock. Temperature range is -50° to +150° F.

Hermetic micro-motors or three types are in process by moving stators completely—so they can be carefully checked against leakage.

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periods, nuclear combustion reactors are compared with combustion reactions at varying pressure Energy radiations, stresses and catalyst concentrations are examined. These possible uses of authority of nuclear combustion gases are presented.

► **Thermal Disruption of Matter** by Beaupois-Saville-B. N. H. Langford, Leicester, England.

A study of the (thermofluid) loss of kinetic energy rate heat caused by the impact of molecules of varying mass and velocities striking a thin protective barrier sheet is being conducted in a space vehicle. A one-dimensional theory would apparently be adequate for most purposes, which are proposed, namely, extremely small in size.

► **The Return of Winged Vehicles** from Satellite Stations—Dr. H. J. Klopfer and M. E. Kachler, Stuttgart.

This paper presents the analysis of a return from a satellite orbit designed into a ballistic trajectory, approach ellipse and a gliding descent. The orbit is elliptical. Leth and drag coefficients, reentry parameters, reentry times, mass and appropriate weights are determined in the gliding descent as developed, mathematically, with the addition of the equations of motion.

► **Analysis of Orbital Systems** by Kroll A. Enecke, Bell Aircraft Corp., Buffalo, N. Y.

Orbital-supply systems of load and passenger-carrying vehicles are studied for systems with lifetimes of 128-500 days for transparency transfer points, 300-500 days for transverse points, 300-500 days for observational satellites and 10,000-40,000 cycles ultimate for deployment and removal of planetary capsules.

► **Possibilities of Electrical Space Ship Propulsion**—F. Stahlberg, U. S. Army Ordnance Missile Center, Huntsville, Ala.

Alarming a typical space ship of 270

tons with a 50-ton payload would experience the small acceleration of 0.00004 G using an electrical propellant power plant, the ship would travel a distance of 104 million miles in one year from zero relative velocity in a heliocentric orbit.

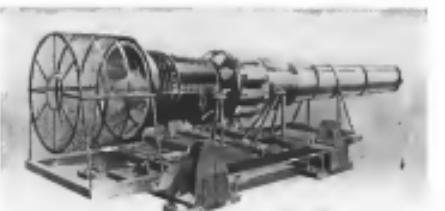
The system is based on a lightweight metal such as carbon or aluminum. The propellant is vaporized and then heated by passing it across a plasma field heated to 10,000° Kelvin. The heated propellant is then accelerated through a magnetic field.

Solar energy, nuclear fission, combustion and an electric pole are considered as methods for the production of power. The solar powerplant, consisting of mirrors, a high-pressure boiler, wing displaced in a fluid, and a turbo electric generator, is called the best choice.

► **Complexity-Cost** observations that was presented at the fifth IAF Congress was the increasing complexity of instruments. Until recently one could, with a little study, understand reasonably well the major known scientific and technical problems related to the flight of a vehicle. Complexity increased in the 4th guided missile field immediately after the war when various missile companies were setting up their guided missile organizations. At that time, group and project leaders could keep pace without difficulty with the progress of their subdisciplines or attacking the problems of guided missile structures, aerodynamics, propulsion, guidance and control and servicing.

So much progress has been made rapidly, however, that the day of the generalist has disappeared except in educational or executive positions. At the 14th IAF Congress, the majority of the present groups and were considerably advanced and complex.

This professional specialization is a clear indication that subdisciplines are entering of age as a science.



British Test Stands for Big Jets

A jet engine test stand which can take propulsive gas up to 15,000 lb. thrust and is transportable was shown this month at the Society of British Aircraft Constructors' 1954

Flying Display at Farnborough. Manufactured by Houseman & Fawcett, Ltd., Wimborne, England. The test stand is designed to handle nearly every type of aircraft turbine



BRIDGEPORT CONTOUR HAND FORGINGS —for lighter, stronger parts at lower cost



See how much metal and machining are saved by using a contour hand forging instead of a machined part. A machined part would be made. The physical properties of the forging are superior to.



Bridgeport's contour hand forging folder eliminates the disadvantages of forgings in many applications. Write or call for your copy.

Aluminum and magnesium contour hand forgings offer a number of savings in terms of the costs, time and materials over other methods of producing a limited number of units—especially for experimental and prototype use.

Bridgeport Contour Hand Forgings have these advantages:

1. Save metal and reduce machining.
2. Grain in forged metal more closely follows contour of part, giving more strength.
3. Furnished in T-6 condition, in most cases ready for machining.
4. X-ray, sonic and ultrasonic testing of every forging assures highest quality.
5. Inventory of aluminum or magnesium forging alloys available for fast production.

Bridgeport's skilled know-how and modern forging facilities with press sizes up to 16,000 tons also assure quality die forgings. For prompt, dependable service on all types of forgings, call your nearest Bridgeport Sales Office.

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Sales Office in Principal Cities—Conveniently located throughout the U.S. and Canada.



BRIDGEPORT ALUMINUM

New G-E automatic a-c electrical system



New 8-6 high-efficiency air generator has no harmonic over 1%, and offers full load recovery in about 1/10 sec. Available ratings 10 to 60 kw, 380/400 volts, 3750/4400 rpm, 150/300 psig.

New G-E compass system reduces aircraft

low drift of gyro system passed its laboratory and flight tests. The above drift curve was obtained during a roll-pitch (fly-by) test at a 0.05 gyro rate. This test, conducted by an outside equipment laboratory, showed that at no time did the drift rate exceed 4°/per hour (10-80°/min) indicating a good system performance. Figure 10 contains data taken in the laboratory flights.

delivers load at 260F

A new, fully automatic parallel a-c electrical system which eliminates manual control switching, and delivers rated load at higher ambient temperatures than ever before possible, has been developed for jet aircraft by General Electric.

Designed for supersonic dash

Designed specifically to meet the high power requirements of supercar dash, this new G6 generator system provides the best voltage regulation and most advanced system protection available in production today. The generator system delivers full load at

- Box level with 134°F cooling air at 8-inch water drop (continuous).
- 68,000 feet with -40°F cooling air at 16-inch water drop (continuous)
- 68,000 feet with 140°F cooling air at 30-inch water drop (continuous)
- 68,000 feet with 180°F cooling air at 7-inch water drop (continuous)

See also [B.2.2.2.2](#)

The first completely automatic ejection system ever produced, the new GE system begins operating as soon as the pilot starts an engine. The system contains only two toggle switches, which can simply "set" at all times unless a fault develops. This eliminates a series of pilot functions, and sharply reduces time required to become airborne after the pilot climbs into the cockpit. System requires no maintenance to be automatic.

Sample sources for incomplete results

General Electric offers a single source for complete a-c or d-c power generation systems for any terrain. For more information, contact your nearest G-E aviation specialist, or write Section 210-40, General Electric Company, Schenectady 1, N.Y.



Major improvements of the next B-8 system to addition to the general area:

Now that's regular (but) designed to be the life of the party! (though complete in only 399 cubic inches and weighs

and 13.8%. General and preventive apoligment (89%) substantially increases and isolates very healthy patients. General panel includes only 10% of the 80% single-gene system and only 10% of the 80% parallel genogram system.

drift rate 66 – 80%

A new microprocessor-controlled directional gyro system which offers a free-gyro drift rate of only 4° per hour—66 to 80 per cent more efficient than present systems—has been developed by General Electric for helicopters and fighter aircraft.

Weight only 17.5 lbs.
Compact and lightweight (approximately 17.5 lbs), the MA-2 compact system is designed to meet the requirements of any synchronization source-indicator, and will operate from all composite transmitters built to Air Force specification AF 1765A.

The DIA 1 system offers accurate, stabilized heading information.

continuously through 200° at a constant shear speed to the earth's magnetic field through a modern remotely controlled computer. Featuring a normal shearing rate of approximately 1° per minute during computer-controlled operation, the BIA-1 system also provides for crystallized latitude-shift compensation.

Structural framework

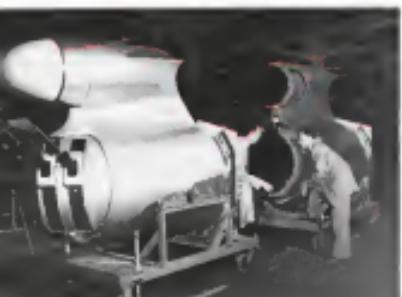
For additional information regarding reliable aircraft systems development, consult your GE aircraft specialist or write Section 230-83A, General Electric Co., Schenectady 5, N. Y.



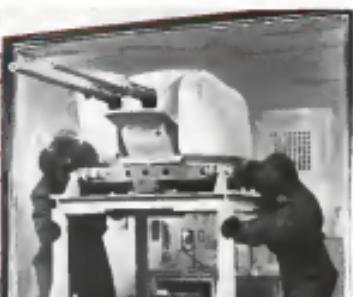
Progress Is Our Most Important Product

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New G-E armament system gives jet bombers

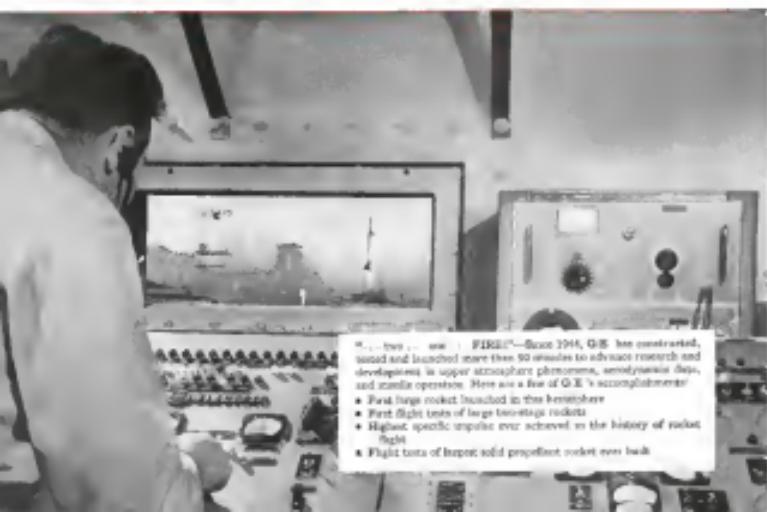


This new 20 mm system is a result of G-E's "Integrated program" approach whereby a group of engineers is responsible both for development and manufacture of a system for greatest efficiency and ease of maintenance.



Field and test checkout with technicians testing plane — 90 P-1700's are equipped with the G-E armament system, enabling it to have twice the armament of the B-52.

New land-sea-air uses for rocket propulsion



WIREL—Since 1946, G-E has constructed, tested and launched more than 50 missiles to advance research and development in upper atmosphere phenomena, aerodynamics, data, and missile operation. Here are a few of G-E's accomplishments:

- First large rocket launched in this hemisphere
- First flight tests of large two-stage rockets
- Highest specific impulse ever achieved in the history of rocket flight
- Flight tests of largest solid propellant rocket ever built

automatic defense

A remote-controlled 20 mm armament system, capable of tracking, tracking and hitting hostile aircraft over 100 feet, fog, has been developed by General Electric for high-speed jet bombers.

"Podged" protection for B-52E and RB-52E

Under contract since three years, the G-E fire control system provides remote, automatic protection for the Boeing B-52E and RB-52E jet bombers. Complete, the 20 mm system is delivered packaged, tested and ready to be installed as a complete unit system.

Automatic warning, tracking, correcting

The system performs the following functions:

- Provides continuous radar warning of approaching aircraft
- Automatically tracks and positions gun on selected target
- Continuously corrects for winds,笔直, and lead errors by means of an electric computing network
- Fire gun automatically when target is in range

Systems Engineering

Designs served as a result of this integrated, effective, compact system. Complete system engineering is one reason why almost every U.S. operational heavy and medium bomber today is equipped with General Electric armament systems. General Electric Company, Schenectady 1, N. Y.



Remote-controlled 20 mm armament system gives the Boeing B-52E and RB-52E jet bombers a heavyweight punch in the rear. Tested by radio, the 20 mm system can track and hit various targets.

under study by G.E.

Two years ago, rocket propulsion had but one use...to launch missiles. But today, rocket power as a source of high pressure, high speed, high temperature gas and power can be used in such applications as: torpedo propulsion, aircraft reentry, high-speed flight, thrust augmentation, rocket booster and sustaining power, high-speed research sleds, glider take-off and landing, supersonic wind tunnels, mining, penetry, and many additional latent military and industrial uses which will be brought out by research and development.

Experience, manpower and facilities make it possible for G-E to design and develop rocket motors or rocket propulsion systems for use on land, sea or in the air.

The amazing growth of rocket propulsion offers a challenge to the ingenuity and imagination of American industry. The challenge to apply the tremendous power of rocket propulsion to ever-newer applications—can be met only through continuous research and development. To this end, General Electric offers its successful experience, its broad manpower, and its eminent facilities. General Electric Company, Schenectady 1, N. Y.



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in **TECO**
Airline seats!

The airline seat you'll find in the most comfortable airplane type, are one of the products of the TECO plant. TECO and its seats has resulted in a 50% demand for TECO seats.

Consult our Engineering Department on your aircraft seat problems—your car can top comfort and cost cutting assurance with TECO's complete aircraft building facilities.

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GROUND SUPPORT SYSTEM for four B-52 Bomber units, eight tanks, cabinet

governing Co., and the Caterpillar Tractor Co.

► **Strato-Unit.** Units here are details about the Boeing B-52 and its covering, more powerful turbines for hot air in the ailing.

► **Current model.** Designating the Boeing 502-TD, consists of two cubic mounted Boeing 502-series gas turbine engines, driving an compressor which delivers 140 lb per square inch of compressed air, and two compressor output is combined together to produce a total of 281 lb per sq. The two engines (which are water-cooled) with fuel tank, instrumentation panels and air flow control are mounted on a trailer.

The output of a single 502-TD compressor—140 lb per square inch per minute of air at an absolute pressure of 33 psi at a temperature of 405 deg. F.

► **A later model.** An compressor built by Boeing supports the flight test program of the company's 707 jet aircraft. The 502-31 is similar to the 502-TD but has increased output.

The 502-31 produces 180 inches—2.25 of 130 lb of air per min at 51.3 psi and 470 deg. F.

► **Still another design.** The Model 502-17B, based on the improved Boeing Model 502-18 air turbine power plant, is in the development stage.

This unit's output has been scaled to 210 lb per sq. air flow of 141 lb per min of pressure and temperatures similar to those of the 502-31.

Divco Aircraft Co. has Boeing portable ME power units in its collection with a 500 lb max. air turbine power plant. Memphis Aircraft has the 502-31 in service in its research and development program, according to Boeing.

To date, Boeing compressor have accumulated some 1,000 hr. of operation—equivalent to well over 1,000 jet aircraft, the company adds.

► **Strato-Unit.** The B-52 ground support system is considerable, made to match the aircraft's mobile cart B-52 unit. This is naturally because the B-52 system is designed to support four aircraft at once and also is capable of

simultaneously furnishing AC power to the plane's electronic equipment in addition to providing power to start the engines.

The B-52 ground support system is made up of these five basic elements:

► **Diesel electric set.** This trailer-mounted unit consists of a D164, V-type diesel engine operating at 1,700 rpm. It drives a Marathon 254-V. three-phase, 60-cycle, 150 kw generator. The trailer unit is a self-supporting unit, all other power equipment is mounted including the radiator, fuel tank and generator; plus maintenance provisions to handle temperatures as low as -65 deg.

The diesel engine features a Caterpillar-designed and-built mixture system which permits the engine to operate at a light load (such as when providing 90-cycles current for avionic equipment maintenance) yet pick up automatically to full load during jet aircraft start.

The diesel unit can be utilized with the JP-4 jet engine, but there are no reports that one has ever been run. All the controls desired for any remote timer system is that all controls and main air connector and bypass may be electrical. Electrical switchable defrosters valves can be chosen in three ratings and all three air valves or reverse are interchangeable and do not require tooling.

These electric air control equipment and switches are designed and manufactured by Electric Service Engineers Co. Inc.

► **Distribution cabinet.** The four-unit distribution cabinet, which furnishes power to the flight, electrical and fuel systems, is in the low voltage main and four motor generator sets, one of which is used with each B-52. The distribution cabinet can has all circuit breakers, control relays, control power transformer, the main bus and overcurrent relays for cable protection. The power circuit breakers are not motor operated, have a continuous rating of 150 ampere and an interrupting capacity of 15,000 ampere at 25,000 volt rms.

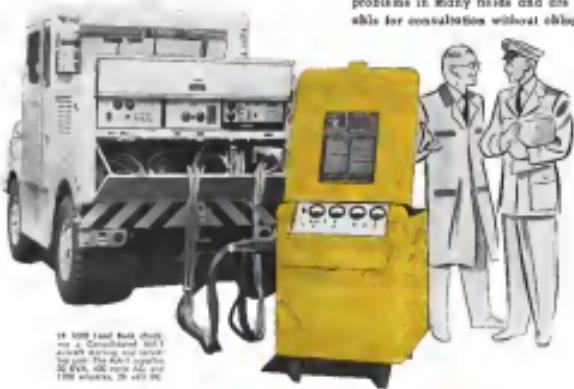
A normally operated circuit breaker



Plus or Minus errors are expensive when valuable aircraft equipment is being started, serviced, or tested. Consolidated load banks provide a wide range of protection for electrical systems and components.

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AIRCRAFT EQUIPMENT DIVISION
MANUFACTURING MANAGEMENT

and breaker is also included plus a transfer switch to allow the system to draw its power from a conventional power source.

• **Rotolite Asster.** The Rotolite Asster consists complete with its own control system. The unit incorporates all necessary rotolite switch, instruments, switch, relay, protective devices, capacitors and power input cables to provide the d.c. power required by the asster. The two rotolite systems are rated at 710 amperes at 23.5 v. They include magnetic amplifier type voltage and current limit regulation and filter. A difficult task, which the unit accomplishes, is output voltage, during changes

from no load to full load, remains constant within rated value, at 2.2 v. • **Motor Control Center.** This unit contains a 60-cycle, synchronous motor with center driving rate 400 cycle generators mounted on a single frame. One has an output of 20 kva, 115v, single phase. Other's output is 175 kva, 115v, three phase. The output voltage regulation of the 400 cycle generators does not exceed 1% from no load to full load. A constant voltage within +1% of the adjusted no load voltage is supplied over the motor required range. Rotolite present manual setting of the no load selected output voltage.



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WHAT'S NEW

Telling the Market

Plastered over straight-faced checklist items, this feature is usually dedicated to Pratt & Whitney, West Hartford, Conn. "Solder 100 lists, vibration and shock specifications for industrial applications." With Rotolite Asster, Inc., Teterboro, N.J. . . "High Voltage Transformers, Their Use and Application," is now backdoor. Bulletin 790 being distributed by F. J. Shuster Machine Co., 2900 Taylor St., Philadelphia 20. "Plant Maintenance Cleaning Guide," a 16-page booklet, may be secured by writing to company headquarters to Oakite Products, Inc., 157 Madison St., New York, N.Y. Catalog "An Approach to Solder Safety" is an addition given in safety training course for electrical power industry, and has been distributed by the John R. Moore Corp., P.O. Box 2, Nutley 10, N.J. . . "Gopher Plan," a 64-page picture-caption book subtitled "Managing Electronics and Mechanics With Gophers," may be obtained by writing on letterhead to Paul A. Wilts, Pekin Elcker Corp., Nenelle, Conn. Dispensing-equipment (DEO) salesman sales are covered in pamphlet Bulletin 54-510 issued by Eclipse Pier Engineering Co., 1812 Euclid Avenue, Racine, Ill.

Publications Received

• The Gunner AMB-100 Story of Gun Cap, by Capt. A. G. Thompson, USAF, 26 pages, 10 1/2 x 13 1/2, soft cover, \$1.00. 1110 16th Street, Division Willow Field, AFPO 304, San Francisco. All profits go to the welfare fund. Capt. Thompson, former aerospace and FID for the 111th, recently became commanding of the 111th, AFM, and is now the Commandant of Cadet Cadets in the Gunnery Wing. These funds, commanded by Maj. Gen. William Turner and Brig. Gen. John F. Hendley, operated the largest and most extensive, modern and up-to-date classroom for the preparation of gunners. The funds of the 111th Gunnery Wing are used for welfare activities in the interest of safety, health, welfare and command.

• Human Engineering Guide for Equipment Designers by Wesley R. Mansfield, Jr., by the University of Michigan, Farmington Hills, Mich. 32 pages, \$1.00. Contains guide to aid in making optimum decisions whenever human factors are involved in man-operated equipment.

• Subminiature Techniques in Low Frequency Receivers, National Bureau of Standards Circular 515, Government Printing Office, Washington, D. C., 160 pages, 46 figures, 2 tables. Covers the second phase of a continuing program for the development of subminiature techniques applicable in airborne military electronic equipment.



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WESCON Unveils New Avionic Devices

- Show highlights include 4-40-mc. transistor, high-shock packaging, attenuator for traveling-wave tubes.

By Philip Klass

Los Angeles—A new type transistor has been operated at frequencies as high as 440 mc., several times higher than any previous transistor, operating up to 100 times more current at 1000 cps. and microwave equipment, a Bell Telephone Laboratories scientist revealed here during the Western Electronic Show & Convention (Wesco).

Another technical paper disclosed a new rugged packaging technique for microwave equipment, developed by the California Institute of Technology Jet Propulsion Lab, which resulted in 10 times the high shock and vibration endurance as good conventional methods.

Approximately 35,000 engineers and scientists got a look at the latest electronic wares of 650 manufacturers exhibiting in the Pan-Pacific subshow, of whom approximately 2,700 attended one or more of the technical sessions held during the three-day Wesco.

• **Cal Avionics Interest**—Other technical papers of particular interest to the avionics field reported on:

- Unusual type attenuator for traveling-wave tubes which are seeing wider use in radio and electronic countermeasures equipment.
- Radically different approach to digital computer design, which cuts the number of components and circuit complexity by a factor of 10 or more.

• New transistor devices that come performance determinants.

• Temperature stabilization techniques for transistor amplifiers, enabling them to operate over a wider range of ambient temperatures.

• **"Intrinsic Resistor"**—Transistor—Bell Labs' new intrinsic barrier transistor, which may eventually be able to operate at frequencies up to 3,000 mc., is reported as a potential replacement for the present-day vacuum tube in some devices. Dr. J. M. Early told Wesco. The experimental transistor, which operated up to a frequency of 440 mc., was operated with a grounded base, Early reported.

If the conventional p-n-p transistor is viewed as a sandwich of impure germanium between two metallic plates, then the new device is a club-sandwich with an added layer of pure germanium



ILL. LARIS: New experiments show high-frequency transistors are mounted in a



ILL. ROP: In laboratory facilities, intense contamination from dust and moisture

is frequency between the (upper germanium) base and the metallic collector. It is referred to as a p-n-p device.

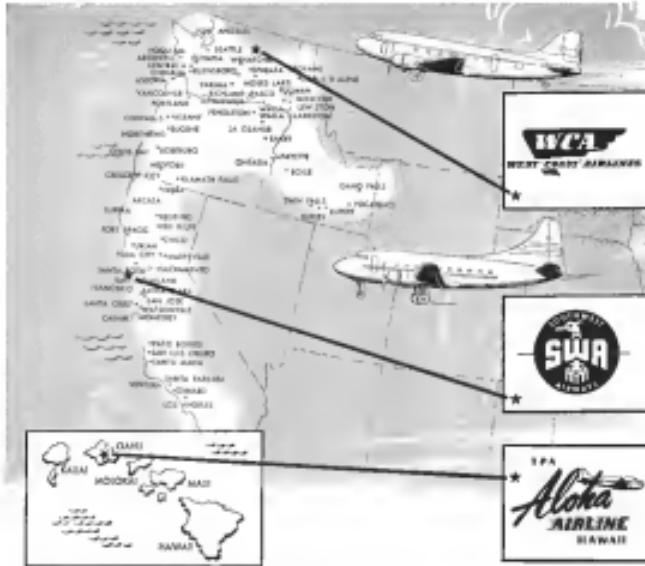
The intrinsic region permits faster movement of positive charges (holes), reduces the reverse saturation current and reduces the stored energy. Early said, to make higher frequency operation possible. The p-n-p construction leaves collector electrodes by a factor of 10-10, he reported, and cuts the resistance of collector current with temperature by roughly half. The new transistor also has the ability to be operated at much higher voltages (up to 100 v.) thereby increasing its power-handling capability.

Early cited these characteristics for one of the new p-n-p transistors.

- Alpha Cut-off Frequency 380-420 mc.
- Base Resistance 150 ohm.
- Collector Capacitance 0.4 v-f.
- Amplification Factor (Alpha) 0.97.

In answer to a question from the floor, Early indicated that the p-n-p transistor was still at the experimental stage and might not be available for several years. The p-n-p construction appears to be applicable to silicon as well as germanium. Early said in response to an *AVIATION WEEK* query.

• **Packaging**—For Missiles—Designers having trouble getting their avionic equipment to withstand the vibration encountered in guided missiles could do well to investigate a new packaging technique developed by Cal Tech's Jet Propulsion Lab and described by M. G. Constant. JPL's test indicate that silicone equipment built with this new construction can withstand up to 90G



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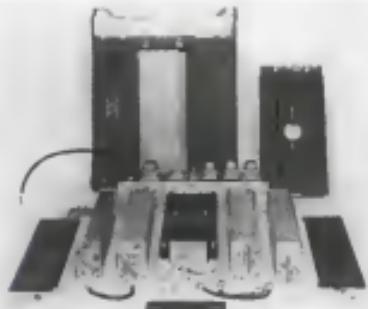


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SLIM CONSTRUCTION of these boxes both for guided missiles compares with this

that a 200 integrator digited differential analyzer could be built with no more than 20 vacuum tubes.

► **Transistor** Transistor—Despite Bell's best sealing techniques, it does not seem to cause problems for missile initiators like the B-57. However, Bell Telephone believes it is extremely important to determine the cause and cures for increasing destruction frequency of one such device as the appearance of a voltage on a floating metal tab.

Recent Bell investigations suggest that the problem is "local" in nature, caused by insulation which burns in the cables during high temperature use, Dr. W. J. Paterson reported. The tabs may also be cleaned to remove quantities from the metal surface of the transistor's metal enclosure. Plated open contacts are to be avoided, and the tabs should be treated with good insulators to coat the transmitter surface with red lead or made brittle.

Despite the lack of tabs for all three solid-state devices, Paterson had some encouraging figures to report on the reliability of transistors used in the Bell system:

- 0.85% failures/1,000 hours for 5870 planar contact transistors used in aircraft systems.
- 0.18% failures/1,000 hours for point contact transistors used in integrated digital computer.
- 0.38% failures/1,000 hours for germanium planar transistors used in a metal halide projector system.

► **Transistor** Stabilization—As the temperature of germanium transistors rises the collector current increases rapidly to the point where the diodes burn itself out. The high ambient temperature rises experienced in aircraft have therefore forced limited the use of germanium transis-



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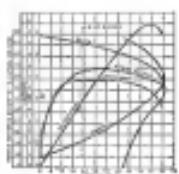
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PHOTO BY
W. H. COOPER



The exclusive Westinghouse cooling design is built around an aluminum frame with integral fins. A new, efficient slanted finned tube provides high volume cooling air flow. The rotor has extended conductor bars giving more efficient current air circulation and cooling without added weight.

Performance curves for the 3-hp motor highlight the efficiency of these new a-c motors and their ability to handle loads from sea level to 30,000 feet. Genuinely versatile and ruggedly designed, they handle even higher temperatures for temporary demands, especially at altitude.

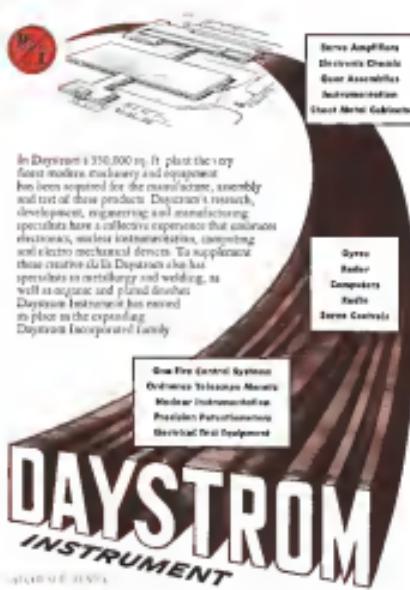
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300F, Hickey reported. The gum ration of germinating transients can be cut to only a "few percent" by causing several stages, but this adds complexity and cuts bandwidth, Hickey said. The technique does not work well with germinated bee fir lack of gum to add.

- Shaw described two key feedback events which enable government transition rated for 49C operation in 50C operating at 80C with less than a 10% gain change. He predicted a significant extension of the operating temperature range of transition when such feedback techniques are employed.



REMBERT'S speaker amplifier for smallish

Boeing 707 to Test Public Address System

Los Angeles—A new local public television station, designed to improve the intelligibility of night announcements and permit playing of recorded comment or radio broadcasts, is slated for testing on Roanoke's new 200-watt transmitter.

Active and specific manufacturers' representatives were given a demonstration of the system at the recent Western Electronics Show & Convention here. Major is Rensler Co., Ltd., of San Francisco.

In a demonstration to American Wear, measurements came out with unusual clarity and intelligibility despite high-level tonalities engine noise displayed over a tape recorder, although the acoustics of a hotel were acoustically different from those in an outdoor urban

► **Features**—The new left-ventricle system operates with Reuter's standard and increased transmuralized transduction, and (Arturas Wozniak Jan 23, '89) or with a decrease in catheter size. The complete heart of the system can be substituted for existing angioplasty Reuter size. Other highlights include:

- **Low Distortion**—At full output waveforms total harmonic distortion is 16% over the frequency range of 200 to 8,000 cm.⁻¹ Reuter 1991.

* Variable Frequency Responses: Amplifiers' natural response (flat within 10 dB from 200 to 5,000 cps) can be preset for varying degrees of low-frequency

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alternation for voice use to provide optimum intelligibility. Attenuators does not cause noise when single filter is used for music reproduction.

• Remote Gain Control. Normal volume level of the system can be increased for important voice announcements because of a remote control located in the cockpit and whereabouts desired.

• Parallel Speaker Outputs. Speakers are available in a wide range of 10-watt to 100-watt amplifier output level. Each has a variable tap voice and music filter to prevent balancing of individual speaker outputs.

• Composable Size & Weight. Speakers are thin and light weight so no longer and much lighter than existing 10-watt per system amplifiers.

Company's address is 2381 Beaufort St. San Francisco 10, Calif.

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A new relay for missile use is particularly capable of withstanding 100G shock and 100G vibration at 500 cps. considerably beyond the 50G limit called for in MIL spec.

The 25-1000 relay is a low PDT unit, with contacts rated at 3 amp



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current load at 25 volts in 114 cycles, 600 cycles. Dual contacts for models AN300-1, with AN connector base weighing 0.5 lb., and AN300-3 with dual terminals, weighing 0.25 lb. Both are hermetically sealed. Ambient temperature range is -40°C to +70°C. Address to: B. R. Beck Co., 1744 Alvarado St., Los Angeles 31, Calif.

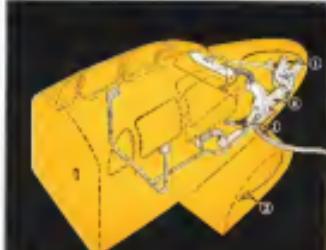
Other new components announced:

- Subminiature releases, available in four new types (4W1, 4W1, 2Y1 and 3Y1) rated for maximum at 10-pf (res.) of 52 to 110 v., and for maximum die. current of 60 to 80 v.

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- **RANGE:** 0.001 to 10 G. in 0.001 G. increments.
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■ **DEPLOY-EMBEDDED SYSTEM:** Type 10C is basically similar with a smaller size, weight and cost requirements. For mounting in support clips or in mobile locations up to 200 kilograms, 1, 2 and 2-wire options with standard bell curves of 1/3. Manufactured at Deltaproducts, Inc., Calabasas, Calif.

■ **COMPACT WIRE-WOUND RESISTOR:** precision type, rated 0.6 watt, wound on flat coil 1 in. in length and 4 in. in width, is suitable up to 5,000 ohms per section, with up to 40 sections available in a single unit. Accuracies to 0.1% are available in standard sizes. Write



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MODEL 45137

■ **AIRBUS TEST TRANSMITTER:** More than a dozen U.S. and foreign orders are currently being filled. Testing the B-747 transponder is 8 months, first reported in *Aerospace* Web, October 1970.

■ **NAL TO TEST BEAVERS RADAR:** National Airlines is installing a Bendix RDR-1 X-band transponder warning radar on a DC-8 for use in the sky. Pan American has recently made the first commercial installation. Bendix reports that first production orders will start to roll off the line in October.

■ **High Frequency Silicon Transistor:** Instruments reports that it has produced high frequency silicon transistors with alpha cut-off frequencies of 20 mc. Company spokesman says that by end of 1973 it expects to be making silicon transistors with 10 mc with alpha cut-off frequencies of 100 ms.

—PK

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Patent-pending

4-1954-1795-70

NEW AVIATION PRODUCTS



ANOMIC CONTROLS grouped on panel

Master Radio Panel Centralizes Controls

A master radio control panel eliminates forward and above the pilot seat to-joint all control necessary for aircraft communications in the DC-3 and Lockheed transport aircraft.

Parts are mounted and wired on aluminum sub-panel, with switches and controls brought through a plastic front panel. Face of plastic is engraved to show function of each control, and panel lights illuminate the engraved brightness is controlled by a variable rheostat.

The panel includes provision for various communications and navigation units, including intraircraft radio and landing systems.

Aerocel, Inc., International Airport,
Miami, Fla.



Handy Calculator Gives Gear Inspection Data

New gear inspection calculator determines the relationship between tooth thickness and radial displacement and total eccentric error for pressure angles of 30, 20 and 14½ deg. when the gear is mounted on a gear rolling fixture. It is used to solve problems like these:

- Change in center distance for a given reduction in tooth thickness
- Integrated tooth thickness change for

AVIATION WEEK September 27, 1954



with THOMPSON EXTRA-LANDINGS RETREADS

The unnecessary expense of frequent wheel changes can be eliminated by using Thompson Extra-Landings Retreads. Bulk boxes to last longer, Thompson retreads provide more landings per tread and more treads per casing. They are a superior product—especially designed and skillfully manufactured.

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Why Choose
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**Because... MENASCO USES
UNIWELD FOR BETTER
LANDING GEAR**

Unwelding of landing gear components results in vital savings in weight, material and machining. That is why menasco enters in the aircraft industry sphere. menasco manufactures a line of precision landing gear using Uniweld's line of precision welding to weld aircraft components together. menasco's Uniweld landing gear has broken down into another major aircraft component. menasco engineers are producing one-hundred percent welds that are structurally identical to the base metal. A current application is in the menasco aircraft landing gear for the newest Douglas A3D-2 Skyraider, warhorse of the Navy's carrier arm.

Importance of menasco's Uniweld process is well demonstrated in this design where the gear not only must withstand the terrific impact of the aircraft landing, but also is utilized as the catapult anchor anchor during the carrier takeoff. menasco's exclusive Uniweld process is another prime example of the company's aggressive program of continuing product research and development.



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a given radial displacement

• Loads of indicator reading when a given gear is turned at standard pitch rates

• Made of plastic components and measuring 5 in. in diameter, the indicator retails for \$3.00 per pair.

Dexter Machine Products, Inc., 20450 U.S. 12 West, Chelsea, Mich.

**Leakage Eliminated
in Rotary Plate Valves**

Optically true hardened steel plates in a new series of lowcost non-solids rotary plate valves are said to eliminate virtually all leakage between ports.

The new valves are housed in light-weight aluminum alloy bodies. The manufacturer claims that by using simple, low-cost materials and standard handle tools are kept unusually light. The valves are available for 1,500- and 3,000 psi service. They meet specification MIL-V-5525A.

Pacific Div., Bondo Aviation Corp., 31450 Sherman Way, North Hollywood, Calif.

ALSO ON THE MARKET

Power stabilizer steel sheet of extremely high surface porosity and high tensile strength is recommended for boundary layer control applications on high-wing-leading aircraft. The sheet is said to have unusually smooth and dense surface and fairly controlled porosity. It provides an airflow of 6 cubic feet per second per square foot at a differential pressure of 0.21 ps. Density is approximately 2050. Cost of sheet stabilizer steel—Aviation Power Metal, Inc., Gales Creek, N.Y.

Perstorp bonding metals, developed for all aluminum alloys, include Solbond for low-temperature bonding applied with soldering iron, copper or fire, does not upset alloy's heat treat. Tin bond, which is stronger and bonds at temperatures from 500 to 500°F, and Welbond, a high-strength, high-temperature material that is capable of bonding at the aluminum heat-treat temperature of the parent metal, making possible continuous heat-treat and bonding—Precision Electronic Research Co., Cleveland, Calif.

Rostratex plastic hose, designed for use with new jet fuels and aircraft lubricants, now comes with ratings, forged aerospace aluminum elbow fittings. New fitting is said to reduce resistance to flow, give more strength for less weight—Bentley Corp., Bellmore, N.Y.

AVIATION WEEK, September 23, 1954



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MECHANISM**

**INSTANTANEOUS—
ACCURATE PRECISION
ANGLE RESOLVER FOR
ANALOG COMPUTERS**

Sibrascope's Sine-Cosine mechanism is a precision analog computer element for converting angular rotational movement into linear sine or cosine movement. Designed to problems of changing variables involving vector components, range, and bearing computations, flight computations, and many other high-accuracy functions. Write for detailed technical information.

SPECIFICATIONS

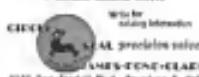
Profile area of rotating
disk is 27.7 square
inches. Differential error
is 0.001°. Resolution
is 0.0001°. Weight is
0.001 lb. = 0.007
kilogram. Dimensions
are 1.075 x 1.075 in.
Weight is 8 oz.

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121-AFT100	\$10.00	122-AFT110	\$10.00	123-AFT120	\$10.00
124-AFT130	\$10.00	125-AFT140	\$10.00	126-AFT150	\$10.00
127-AFT160	\$10.00	128-AFT170	\$10.00	129-AFT180	\$10.00
130-AFT190	\$10.00	131-AFT200	\$10.00	132-AFT210	\$10.00
133-AFT220	\$10.00	134-AFT230	\$10.00	135-AFT240	\$10.00
136-AFT250	\$10.00	137-AFT260	\$10.00	138-AFT270	\$10.00
139-AFT280	\$10.00	140-AFT290	\$10.00	141-AFT300	\$10.00
142-AFT310	\$10.00	143-AFT320	\$10.00	144-AFT330	\$10.00
145-AFT340	\$10.00	146-AFT350	\$10.00	147-AFT360	\$10.00
148-AFT370	\$10.00	149-AFT380	\$10.00	150-AFT390	\$10.00
151-AFT400	\$10.00	152-AFT410	\$10.00	153-AFT420	\$10.00
154-AFT430	\$10.00	155-AFT440	\$10.00	156-AFT450	\$10.00
157-AFT460	\$10.00	158-AFT470	\$10.00	159-AFT480	\$10.00
160-AFT490	\$10.00	161-AFT500	\$10.00	162-AFT510	\$10.00
163-AFT520	\$10.00	164-AFT530	\$10.00	165-AFT540	\$10.00
166-AFT550	\$10.00	167-AFT560	\$10.00	168-AFT570	\$10.00
169-AFT580	\$10.00	170-AFT590	\$10.00	171-AFT600	\$10.00
172-AFT610	\$10.00	173-AFT620	\$10.00	174-AFT630	\$10.00
175-AFT640	\$10.00	176-AFT650	\$10.00	177-AFT660	\$10.00
178-AFT670	\$10.00	179-AFT680	\$10.00	180-AFT690	\$10.00
181-AFT700	\$10.00	182-AFT710	\$10.00	183-AFT720	\$10.00
184-AFT730	\$10.00	185-AFT740	\$10.00	186-AFT750	\$10.00
187-AFT760	\$10.00	188-AFT770	\$10.00	189-AFT780	\$10.00
190-AFT790	\$10.00	191-AFT800	\$10.00	192-AFT810	\$10.00
193-AFT820	\$10.00	194-AFT830	\$10.00	195-AFT840	\$10.00
196-AFT850	\$10.00	197-AFT860	\$10.00	198-AFT870	\$10.00
199-AFT880	\$10.00	200-AFT890	\$10.00	201-AFT900	\$10.00
202-AFT910	\$10.00	203-AFT920	\$10.00	204-AFT930	\$10.00
205-AFT940	\$10.00	206-AFT950	\$10.00	207-AFT960	\$10.00
208-AFT970	\$10.00	209-AFT980	\$10.00	210-AFT990	\$10.00
211-AFT1000	\$10.00	212-AFT1010	\$10.00	213-AFT1020	\$10.00
214-AFT1030	\$10.00	215-AFT1040	\$10.00	216-AFT1050	\$10.00
217-AFT1060	\$10.00	218-AFT1070	\$10.00	219-AFT1080	\$10.00
220-AFT1090	\$10.00	221-AFT1100	\$10.00	222-AFT1110	\$10.00
223-AFT1120	\$10.00	224-AFT1130	\$10.00	225-AFT1140	\$10.00
226-AFT1150	\$10.00	227-AFT1160	\$10.00	228-AFT1170	\$10.00
229-AFT1180	\$10.00	230-AFT1190	\$10.00	231-AFT1200	\$10.00
232-AFT1210	\$10.00	233-AFT1220	\$10.00	234-AFT1230	\$10.00
235-AFT1240	\$10.00	236-AFT1250	\$10.00	237-AFT1260	\$10.00
238-AFT1270	\$10.00	239-AFT1280	\$10.00	240-AFT1290	\$10.00
241-AFT1300	\$10.00	242-AFT1310	\$10.00	243-AFT1320	\$10.00
244-AFT1330	\$10.00	245-AFT1340	\$10.00	246-AFT1350	\$10.00
247-AFT1360	\$10.00	248-AFT1370	\$10.00	249-AFT1380	\$10.00
250-AFT1390	\$10.00	251-AFT1400	\$10.00	252-AFT1410	\$10.00
253-AFT1420	\$10.00	254-AFT1430	\$10.00	255-AFT1440	\$10.00
256-AFT1450	\$10.00	257-AFT1460	\$10.00	258-AFT1470	\$10.00
259-AFT1480	\$10.00	260-AFT1490	\$10.00	261-AFT1500	\$10.00
262-AFT1510	\$10.00	263-AFT1520	\$10.00	264-AFT1530	\$10.00
265-AFT1540	\$10.00	266-AFT1550	\$10.00	267-AFT1560	\$10.00
268-AFT1570	\$10.00	269-AFT1580	\$10.00	270-AFT1590	\$10.00
271-AFT1600	\$10.00	272-AFT1610	\$10.00	273-AFT1620	\$10.00
274-AFT1630	\$10.00	275-AFT1640	\$10.00	276-AFT1650	\$10.00
277-AFT1660	\$10.00	278-AFT1670	\$10.00	279-AFT1680	\$10.00
280-AFT1690	\$10.00	281-AFT1700	\$10.00	282-AFT1710	\$10.00
283-AFT1720	\$10.00	284-AFT1730	\$10.00	285-AFT1740	\$10.00
286-AFT1750	\$10.00	287-AFT1760	\$10.00	288-AFT1770	\$10.00
289-AFT1780	\$10.00	290-AFT1790	\$10.00	291-AFT1800	\$10.00
292-AFT1810	\$10.00	293-AFT1820	\$10.00	294-AFT1830	\$10.00
295-AFT1840	\$10.00	296-AFT1850	\$10.00	297-AFT1860	\$10.00
298-AFT1870	\$10.00	299-AFT1880	\$10.00	300-AFT1890	\$10.00
301-AFT1900	\$10.00	302-AFT1910	\$10.00	303-AFT1920	\$10.00
304-AFT1930	\$10.00	305-AFT1940	\$10.00	306-AFT1950	\$10.00
307-AFT1960	\$10.00	308-AFT1970	\$10.00	309-AFT1980	\$10.00
310-AFT1990	\$10.00	311-AFT2000	\$10.00	312-AFT2010	\$10.00
313-AFT2020	\$10.00	314-AFT2030	\$10.00	315-AFT2040	\$10.00
316-AFT2050	\$10.00	317-AFT2060	\$10.00	318-AFT2070	\$10.00
319-AFT2080	\$10.00	320-AFT2090	\$10.00	321-AFT2100	\$10.00
322-AFT2110	\$10.00	323-AFT2120	\$10.00	324-AFT2130	\$10.00
325-AFT2140	\$10.00	326-AFT2150	\$10.00	327-AFT2160	\$10.00
328-AFT2170	\$10.00	329-AFT2180	\$10.00	330-AFT2190	\$10.00
331-AFT2200	\$10.00	332-AFT2210	\$10.00	333-AFT2220	\$10.00
334-AFT2230	\$10.00	335-AFT2240	\$10.00	336-AFT2250	\$10.00
337-AFT2260	\$10.00	338-AFT2270	\$10.00	339-AFT2280	\$10.00
340-AFT2290	\$10.00	341-AFT2300	\$10.00	342-AFT2310	\$10.00
343-AFT2320	\$10.00	344-AFT2330	\$10.00	345-AFT2340	\$10.00
346-AFT2350	\$10.00	347-AFT2360	\$10.00	348-AFT2370	\$10.00
349-AFT2380	\$10.00	350-AFT2390	\$10.00	351-AFT2400	\$10.00
352-AFT2410	\$10.00	353-AFT2420	\$10.00	354-AFT2430	\$10.00
355-AFT2440	\$10.00	356-AFT2450	\$10.00	357-AFT2460	\$10.00
358-AFT2470	\$10.00	359-AFT2480	\$10.00	360-AFT2490	\$10.00
361-AFT2500	\$10.00	362-AFT2510	\$10.00	363-AFT2520	\$10.00
364-AFT2530	\$10.00	365-AFT2540	\$10.00	366-AFT2550	\$10.00
367-AFT2560	\$10.00	368-AFT2570	\$10.00	369-AFT2580	\$10.00
370-AFT2590	\$10.00	371-AFT2600	\$10.00	372-AFT2610	\$10.00
373-AFT2620	\$10.00	374-AFT2630	\$10.00	375-AFT2640	\$10.00
376-AFT2650	\$10.00	377-AFT2660	\$10.00	378-AFT2670	\$10.00
379-AFT2680	\$10.00	380-AFT2690	\$10.00	381-AFT2700	\$10.00
382-AFT2710	\$10.00	383-AFT2720	\$10.00	384-AFT2730	\$10.00
385-AFT2740	\$10.00	386-AFT2750	\$10.00	387-AFT2760	\$10.00
388-AFT2770	\$10.00	389-AFT2780	\$10.00	390-AFT2790	\$10.00
391-AFT2800	\$10.00	392-AFT2810	\$10.00	393-AFT2820	\$10.00
394-AFT2830	\$10.00	395-AFT2840	\$10.00	396-AFT2850	\$10.00
397-AFT2860	\$10.00	398-AFT2870	\$10.00	399-AFT2880	\$10.00
400-AFT2890	\$10.00	401-AFT2900	\$10.00	402-AFT2910	\$10.00
403-AFT2920	\$10.00	404-AFT2930	\$10.00	405-AFT2940	\$10.00
406-AFT2950	\$10.00	407-AFT2960	\$10.00	408-AFT2970	\$10.00
409-AFT2980	\$10.00	410-AFT2990	\$10.00	411-AFT3000	\$10.00
412-AFT3010	\$10.00	413-AFT3020	\$10.00	414-AFT3030	\$10.00
415-AFT3040	\$10.00	416-AFT3050	\$10.00	417-AFT3060	\$10.00
418-AFT3070	\$10.00	419-AFT3080	\$10.00	420-AFT3090	\$10.00
421-AFT3100	\$10.00	422-AFT3110	\$10.00	423-AFT3120	\$10.00
424-AFT3130	\$10.00	425-AFT3140	\$10.00	426-AFT3150	\$10.00
427-AFT3160	\$10.00	428-AFT3170	\$10.00	429-AFT3180	\$10.00
430-AFT3190	\$10.00	431-AFT3200	\$10.00	432-AFT3210	\$10.00
433-AFT3220	\$10.00	434-AFT3230	\$10.00	435-AFT3240	\$10.00
436-AFT3250	\$10.00	437-AFT3260	\$10.00	438-AFT3270	\$10.00
439-AFT3280	\$10.00	440-AFT3290	\$10.00	441-AFT3300	\$10.00
442-AFT3310	\$10.00	443-AFT3320	\$10.00	444-AFT3330	\$10.00
445-AFT3340	\$10.00	446-AFT3350	\$10.00	447-AFT3360	\$10.00
448-AFT3370	\$10.00	449-AFT3380	\$10.00	450-AFT3390	\$10.00
451-AFT3400	\$10.00	452-AFT3410	\$10.00	453-AFT3420	\$10.00
454-AFT3430	\$10.00	455-AFT3440	\$10.00	456-AFT3450	\$10.00
457-AFT3460	\$10.00	458-AFT3470	\$10.00	459-AFT3480	\$10.00
460-AFT3490	\$10.00	461-AFT3500	\$10.00	462-AFT3510	\$10.00
463-AFT3520	\$10.00	464-AFT3530	\$10.00	465-AFT3540	\$10.00
466-AFT3550	\$10.00	467-AFT3560	\$10.00	468-AFT3570	\$10.00
469-AFT3580	\$10.00	470-A			



WORLD AIRLINE DELEGATES at the 1965 annual general IATA meeting get resolutions of witness on Interavia air services

IATA Looks to Air Cargo for New Profits

- **Hildred says expansion of airfreight would increase revenues but warns of risk in buying the equipment.**
- **Committees suggest faster development of shorthand cargo services to solve airlines' financial problems.**

By Frank Shaw, Jr.

PALE the world's scheduled airlines, fighting ever rising operating costs and increased government taxation without increase of their fare structure, are looking for other ways to boost earnings profits and strengthen the economics of the airlines.

One major potential solution, visibly wrought up to now, is worldwide expansion of air cargo, delegates to the 1965 annual general meeting of the International Air Transport Assn. have ruled.

• **Rossmount Economics**—IATA director general Sir Wilfrid P. Hildred, in open discussion, told the meeting the time has come to give as much emphasis to airfreight development as airlines have to development of passenger services over the years.

An industry that has digested the complex international pattern of fares for first-class airtravel and even Class "B" service should be able to sheet its ingenuity and accommodations to its purpose of the cargo product, he said.

Expressing the hope that the level of

challenge than a deterrent, holding that the industry has taken equal if not more serious risks in pursuing in the passenger field over the years.

• **Cargo Potential**—Another important factor in the airline's financial survival efforts to stimulate development of the helicopter for widespread scheduled service, held out as another avenue for the bolstering of revenues through additional traffic.

IATA's technical committee and others and the general public no longer think of the helicopter as being of potential interest in the air transport in theory at some website before date, pending to its present use in passenger aviation.

• **The Recent Emergence of Commercial Aviation**—In the conclusion he added that there is an underlying and even ominous trend. "Rates cannot be directly reduced until all cargo aircraft are available, yet the scarcity of such aircraft keeps rates high and traffic restrained."

• **Wilfrid and the Artifical Stimulus**—to air-cargo traffic resulting from abnormal political conditions has put more freight transports into operation. "But once the stimulus is removed, the problem of what to do with the aircraft in normal commercial markets," he added.

The IATA director general was quick to point out that he views those positive considerations in more in a

for use...at 60° below



The CF-100 with its ORENDA's was meant to fly and fight in the Arctic. So that's where it's been tested. In the bitter wind-swept cold, engines won't start, controls move, visibility is poor, fatigues and the pilot's hands and feet be comfortable without minutes after a "Bitter Land" flight.

It's routine now to leave a CF-100 out overnight with but a light wrap to keep the wings clear of frost.

After a 15-hour "cold soak" in temperatures of 30° to 60° below they pull the wraps, flick switches and take off. If it's not cold enough at Nanton, near Edmonton, they fly nonstop to Fort Cheriell or Hudson's Bay.

Defender of the Arctic, the CF-100 is in squadrons service with the R.C.A.F. at strange bases. Ga

day flights, it probes the perimeter of those areas most likely to need watching.



This CF-100 has had overnight "Cold Soak."

CF-100, WORLD FLIGHT RECORD—the J100 under from Fairbanks to North Bay was recently flown nonstop by a CF-100 in 3 hours, 30 minutes at 250 M.P.H. Piloted by P/L M. Robson with P/L D. Thorpe, Navigator, the record flight of nearly performed by the CF-100s of 427 Wing, 1st Wing, 1st Wing, RCAF, Uplands, Ontario. It is the longest nonstop flight completed by a fighter aircraft.

Ground Civic safety boat
from quick starting ORENDA

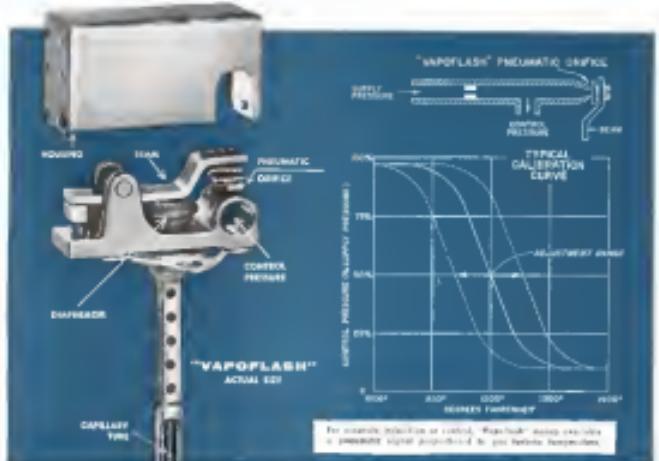


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MALTON, ONTARIO



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... an entirely new development in gas turbine control components

VapoFlash™ — a unique new measuring probe — provides the advantage of high-gain parametric output. The power level of the control signal is such that greatly simplified mechanisms can be applied to withstand severe engine and afterburner fuel flow, and the exhaust nozzle area of turbine engines.

The accurately calibrated "VapoFlash" probe expands a narrow-diameter capillary tube to the gas stream of the jet engine. As the gas temperature rises to the control set point, the pressure of the vaporized mercury in the element develops a signal which is measured by a metal diaphragm. As the diaphragm moves, it actuates a preloaded

controller valve which operates a pneumatic actuator. Compressor discharge pressure serves as supply pressure; adequate power is conveniently available for control purposes. With several "VapoFlash" units connected in parallel for averaging, reliable measurement and control of gas turbine temperatures is simplified.

We are confident that our long experience in developing, manufacturing and testing jet engine control components can be of practical service to you. Our engineering department will welcome the opportunity to analyze your control requirements.



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THERMOCOUPLES • HYDRAULIC VALVES • JT ENGINE AFTERBURNER CONTROL SYSTEMS



NEW IATA PRESIDENT James T. Tripp (right), who will serve 1969-1970 term, is congratulated by Max Bluman (left), an IATA president and head of IATA for crossing over to Wilkes World. IATA director general, and in congratulation, Bluman of Pan American World Airways president Tripp comes the U.S. will be host in 1975.

IATA airline standpoints, especially those in Europe, is as powerful as the airline's operations. It is well known that most European airways generally are not as liberal as their American counterparts. IATA's executive committee agreed the carriers set to reach in a "P-1" with no hope at their respective governments.

One of the main reasons for the economic problems of the developing nations, the committee said, is the inadequate utilization of aircraft—with a high number of airings at landings in proportion to the number of passengers.

In addition, the committee said, the short-haul airways must face strong passenger preference for travel at peak hours of the day. Airlines do not want to travel at an airport late at night or early for another hour flight to terminal to the city.

The airline, with its facility for heating in developing areas, could do a great deal to help solve this problem, the committee pointed out.

► **David Soloway**—Stress reduction of my considerable profit from oil price expansion or helicopter operations will be somewhat in the future, IATA solvers who are working toward a cost structure and direct relation to their revenues believe that cutting expenses from a base makes sense.

Continuing with its fuel-oil program, the IATA firms its "fuel-oil campaign," members, I believe are making a concerted effort to reduce unnecessary fuel costs and to strengthen their national organizations. The committee firmly believes the campaign alone can save millions of dollars annually.

"It will go a long way toward cashing a better return between costs and profits," one member.

► **Red Tape**—"Red-tapeification" originally referred to a complication of

governmental procedures—procedures which cut the airlines a great deal. It was found, however, that these procedures do not fit in with their use of aircraft following the termination of the Komarov orbit," the Board said that since it cannot effectively deal with the problems of aircraft, it has turned to a "P-1" with no hope at their respective governments.

Typical example cited was the passenger manifest. IATA has been doing an extensive effort to have governments with eliminate them, but certain in-line countries that used them to collect taxes on ticket coupons, etc.

One particular airline that eliminated one copy of the manifest, however, had the following to report:

"By adoption of a single copy of the manifest used for statistical purposes on its new service, it has saved nearly 100,000 statistical reports, 12,000 short-haul passengers, 1000 space for 600,000 short-haul passengers, 1000 space for 8,000 short-haul passengers and the carriage of 8,000 short-haul passengers."

The medium-size airline, it was pointed out, accounts for about 95% of the world's traffic, and there are on the average, 10 copies of each manifest. Multiplication of these figures, the Board goes an approximation of the unnecessary effort and expense the industry is doing to its own detriment.

"No Show" Soloway, facing serious problem IATA hopes to be able to work out in the very future in the "no show" Roy W. Lindland, vice president of United Air Lines, estimates that as there are costing airlines about \$100 million a year.

Lindland and his colleagues to this problem like in a tightening of airline reservation systems along with measures of persuading the public to give advance notice of cancellation.

Overseas Charters May Stop Filing Rates

Cred Administrations Board plans to end the requirement for filing tariffs on overseas military charter operations to eliminate possible paper work.

The Board says it lacks power to prescribe rules for international operations and "is unable to take effective" action since though tariffs at airconcessions levels are filed.

Although it does have authority to investigate and remove rules of "useless" discrimination, a foreign operations board, CAB, that is not yet adopted to military charter operations for crucial operations and short periods. Before investigation could be completed, CAB adds, "the transports would probably have taken place rendering control ineffective."

Pointing to "the unconscionable" levels to which military charter rates have risen in a small of the policy of unrestricted bidding and a majority excess of mobile capacity for charter following the termination of the Komarov orbit," the Board said that since it cannot effectively deal with the problems of aircraft, it has turned to a "P-1" with no hope at their respective governments.

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The requirements were formulated by a subcommittee of the Air Council, consisting of the chairman and the chairman of the approach lighting committee.

These configurations are specified, all requiring two threshold bars and one or more cross bars.

One configuration is to be installed at the approach end of an instrument runway with no designation for an over air area. A second will be used at the approach end of an instrument runway with no designation for an over air area.

The third configuration has only one runway application.

The criteria are proposed to be 1,000 ft long. Authority can be obtained for shorter widths when terrain or other problems otherwise.

Approach with approach zone lights will consist suspended lighting lights when CAA and local studies indicate they are necessary.

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Model 100-A Oil Cooler

ATA, ALPA Clash on Heat Rule

Temperature and humidity no takeoff hazard, airlines claim; but pilots say 100% accountability is needed

Temperature and humidity extremes affect performance of an aircraft during takeoff but there is no evidence that they constitute a hazard to airline operations, *Air Transport News* claims.

Opposing a proposal in the fifth annual Civil Aviation Board Airworthiness Review in Washington, D. C., for an increase in 100% temperature and humidity accountability in calculating aircraft weight, ATA argued that the present 50% rule is more than sufficient.

ATA Reconciling—On Part 317 of the Civil Air Regulations, which is the aircraft weight regulation, ATA says, "we did not create, ATA says, because:

- Additional temperature and humidity accountability for jet aircraft powerplants will not improve maintainability of the basic safety level.
- The effect of increased weight penalties will seriously impair the industry's ability to make high weight modifications or improvements when necessary.
- The economic effect of unnecessary weight penalties will be severe and unnecessary.

ALPA Response—Despite the good faith record card by the scheduled airline organization, *South Wind* + *Alfaero* both since early 1958, without an air order that can be blamed on insufficient correction of weight to meet temperature and humidity conditions—the pilots say, "It is only a matter of time before we will lose a plane." ALPA continues:

- That an "adequate recognition" that increased accountability is needed for heat, humidity.
- Some airlines voluntarily have put in effect their own requirements to meet these conditions.
- The safety record is good because of engine reliability and not because of stringent performance requirements when one engine is inoperative.
- Upshot of penetrations at the CAB review is that ALPA representatives will not let their members to study ATA's arguments and consider them. These demands from delegates to the review were under a mandate from ALPA to press for a change in Part 317.

CAIB chairman Jim Curran says the association was taking only the initial step toward formulation of arguments against the proposal for takeoff weight.

Accident Record—The ATA report included a study of the accident records since introduction of the 50% temperature and humidity rule in 1947. During that time, there have been 350

accidents involving at least substantial damage. In some of them, according to ATA, was performance considered a factor.

Citing the case of three Convair L-101 aircraft (at Memphis, Tulsa and Buffalo), the airline association and CAB experts to prove the first two were caused by low speeds in combination with hot temperatures. The Buffalo craft was attributed to "excessive surface friction" procedure.

Says ATA, "No reasonable amount of weight reduction would have made the aircraft flyable under conditions found at the time of the accident."

Other ALPA members include:

- The great majority of engine failures are not completely due to maintainability and not likely to occur at the most critical time in takeoff.
- There are "hidden margins," such as general effect, that improve engine performance beyond the standard required in the present regulations.

ATA holds that this results in 75% temperature accountability under the existing 50% rule.

ALPA Response—Despite the good faith record card by the scheduled airline organization, *South Wind* + *Alfaero* both since early 1958, without an air order that can be blamed on insufficient correction of weight to meet temperature and humidity conditions—the pilots say, "It is only a matter of time before we will lose a plane." ALPA continues:

• Airlines stress the importance of using available power for takeoff in the initial stages of flight.

- The payload penalty that would be suffered by the airlines with full temperature and humidity accountability would be substantial. Studies at Convair and at the *Alfaero* plant in Brazil show that 50% weight reduction would cause a 15% and cold decrease in payload increased 10%.

Only cold load operations showed a decrease, with a 5% drop.

For flights recorded at CAB air route traffic control centers reached 15,619,680, an increase of 9% over the 1955 figure of 14,329,480.

The Los Angeles center also reported the greatest number of airway segment oppositions, with 45,025—nearly 18% of the total of 245,082. Seattle was second with 41,596.

But our proposed changes in Part 6 of CAB, designed to make them applicable to rotary wing aircraft.

In general, however, the session was limited to a broad discussion because government opinion and the industry accepted that more study and argument is needed before final rules can be set down.

Among the topics discussed were weight limitations, number of engines, effect of altitude, temperature and humidity, flight performance, cockpit, maintenance and passenger cabin facilities.

CAA Control Tower Operations Increase

A report on Civil Aviation Ad-
ministration airport traffic control
tower operations shows broad operations
for 1956 increased by more than
one million over 1955.

They total 37,261,403 for 1956, 36,
216,716 for 1955.

Tower traffic originated more than
200,000 operations. Chicago (Midway)
549,350, Los Angeles, 277,093, Miami,
Fla., 265,410, Honolulu, 235,385,
Cleveland, 194,972, Denver, 194,425,
New York (LaGuardia) 235,883, Atlanta,
223,847, Long Beach, Calif., 202,205,
181,461, Dallas, 204,625, Memphis, N. J.,
203,793, and Wichita, 202,593.

• In 1956, 10,000 operations increased by
60% over 1955. Airline operations increased 7%, airline terminal operations
increased 97%, military local traffic
increased 15%, and civil domestic opera-
tions increased 10%.

Only civil local operations showed a
decrease, with a 5% drop.

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15,619,680, an increase of 9% over the
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The Los Angeles center also reported
the greatest number of airway segment
opposition, with 45,025—nearly
18% of the total of 245,082. Seattle
was second with 41,596.

MATS, Civil Airline Overlap to Be Studied

Edig Alberel, New York aviation
consultant, will make a study of Military
Air Transport Service for the transportation
subcommittee of the Hoover Commission's Committee on
Business Organization of the Department of Defense.

Study is designed to give the com-
missioner a possible application of
MATS and commercial airline opera-
tions. Recommendations will be made
on the best methods to use the com-
pany's air transport resources at the low-
est cost to the taxpayer.

Studies also are to be made of De-

State Department's management of passenger and freight traffic. James Kerasi, former member of Interstate Commerce Commission and of the Office of Defense Transportation, will direct the passenger traffic study. John R. Staley, Chicago vice president traffic of Quaker Oats Co., will direct the freight traffic study.

CAB ORDERS

(Sept. 9-Sept. 15)

GRANTED.
 Flying Tiger Line's application for an exemption to make a charter passenger flight from Lubbock to Mexico.

Stock Airlines and Flying Tiger Line's application for leave to increase on the non nonstop domestic transoceanic and intra-

Airlines' application for a temporary exemption allowing it to overfly certain points on Route 97 with certain restrictions.

Penske Airline's application for leave to increase on the route involving direct nonstop flights between Newark, N.J., and Atlanta. The "Comet" provision for the same purpose is denied.

Coastal Airlines' application for a temporary exemption allowing it to change its specific service to Honolulu, Oahu.

DISMISSED

W. Tex Lines' application for a re-approval for unchartered service to the Western Pacific, by default.

Mercury Airline's application for a route of public convenience and necessity, by default.

Frontier Airline's application for a route of public convenience and necessity, by default.

Capital Airlines' application for service to Richmond, Va., as a stop on its Washington-Honolulu route. Capital chose not to pursue its application at present.

Chamber of Commerce Studies Airline Policy

The transportation and communications department of the U.S. Chamber of Commerce is considering a number of proposals for charter transportation policy.

Policy suggestions presented in the committee's report include these proposals from airline trade associations:

- Government policy by regulation on airfares under which nonstopched airfares are given.

- Load service orders are given a more stable guarantee of being able to contract to operate, if not for permanent certificates then by extension of the present term of certificates.

- A specific policy be set up by governing government committees involving such services in the Military Air Transport Service.

- User charges for transportation media, such as the federal airways, be studied and recommendations be made for a reasonable schedule of charges.
- A special subcommittee will review the air grant report of the Air Council Rating Committee and study its relation to charter policy.

The committee suggested just policies, favoring the repeal of Section 22 that governs areas involved in government contracts with private transportation media.

All proposals will be reviewed by the transportation committee and recommendations made for policy changes or new rules in the charter when it can be ready for its annual meeting in May.

SHORTLINES

Allieday Airlines reports passenger traffic for August up 35% over last year. Scheduled miles flown were up 35%, load factor has exceed 85%.

Allieday is concluding a deal with Lockheed for two more Super Constellations. The Constellations will join the three Super Constellations scheduled to go into service Oct. 1.

Central Airlines increased its fifth consecutive month. During the past five years, Central moved 162,400 passengers, flew 23,880,000 passenger miles.

Northwest Orient Airlines set two new records in August when 127,713 passengers were flown 181,328,000 passenger miles over domestic and international routes.

Pioneer Air Lines flew a record 3,902,000 revenue passenger miles during August, topping the previous year's figure of 3,900,000 as October 1952. Pioneer carried a total of 16,614 passengers, a 17% increase over July and a 50% gain over August 1951. Mail carried 8,273 to 18,850 ton-miles or an increase of 139% to 6,558 packages, and air freight gained 46% to 34,735 ton-miles.

Rocky Airlines will open an winter charter program through the Caribbean. Des F. Custer ran from one to two weeks, except from \$126.50 to \$199.95.

Westair Air Lines starts a stopover center between Los Angeles and Seattle/Tacoma this week, when four new DC-6s go into service. New flights will follow the pattern of WAL's chopper-and-couch "Caribou" service and will feature a special eight-passenger compartment for business conferences.

AVIATION CALENDAR

Sept. 10-Get Lufthansa Technical Conference for Aviators, Bell Auditorium Wash. D.C.
Sept. 10-13-American Power Systems, Inc., Lexington Hotel, New York.
Sept. 10-13-American Petroleum Institute, Chicago.
Oct. 5-7-Champion Spark Plug Co., 11th annual Aircraft Spark Plug and Ignition Conference, Stamford, Conn., Oct. 6.
Oct. 11-13-Confederation of American Business, National Automobile Manufacturers, Aircraft Propellers Forum and Aircraft Engineers, Douglas Hotel, Los Angeles.
Oct. 11-12-American Industries Ass., new auto parts on aircraft parts Cleveland.
Oct. 13-15-American Ass. of Airport Executives, 19th conference, airport management and operations, University of Oklahoma Norman, Okla.
Oct. 14-15-Bell Telephone Laboratories and American Research Foundation, No. 100 Congress St., Boston, Massachusetts.
Oct. 14-15-Institute of the Acoustical Sciences and Canadian Acoustical Institute joint meeting, Montreal.
Oct. 17-18-International Union of Aviation Sciences, annual meeting, New York.
Oct. 19-21-American Society of Naval Engineers and American Society of Locomotive Engineers, Joint Conference, Locomotive Engineers, Hotel Roosevelt, Long Beach, Calif., Pasadena.
Oct. 19-22-National Safety Council, Annual Meeting, Statler Hotel, New York City.
Oct. 19-22-American Society of Lubrication Engineers, Annual Meeting, Statler Hotel, New York City.
Oct. 20-22-American Society of Lubrication Engineers, VFW Club, Washington.
Oct. 20-29-American Electrical Society, 11th annual double meeting, Pan Pacific Auditorium, Los Angeles.
Nov. 1-2-American Wildlife Society, Bell Auditorium, Los Angeles, Calif., Chicago.
Nov. 4-6-American and Canadian airplane manufacturers, West Coast conference, Sherman Auditorium, Seattle, Washington.
Nov. 8-10-National Aviation Trade Ass., annual meeting and meeting, Sherman Auditorium, Miami, Fla., Fla.
Nov. 8-10-Bureau of Industry & Commerce, Ass. of Canadian, annual meeting, Clinton, Ontario, Quebec City.
Nov. 9-12-Int'l. Law Firm Ass., annual meeting, American Hotel, Chicago.
Nov. 10-12-American Management Society, 11th annual Inst. and analysis study, Hotel Sherman, Chicago.
Nov. 11-13-National Research Council, annual meeting, Bell Auditorium, Wash. D.C.
Nov. 12-13-National Program on Quai Control and Reliability in Electronics, Statler Hotel, New York.
Nov. 14-17-American Telephones and Telegraphs Ass., 11th annual meeting, Mayflower Hotel, Washington, D.C.
Nov. 17-19-California Ass. of Airport Executives, annual meeting, Clare Hotel, San Jose, Calif.
Nov. 29-Dec. 1-American Society of Mechanical Engineers, Aviation Division, annual meeting, New York.

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HANDLEY FREE VICTOR (second prototype) begins flight tests during work of the show.



WICKERS VALIANT (Impresario) and Aria Valente, data creek swept and drifts wing



卷之三十一



SHORT SEASIDE *Adelomyia* adelskii plana (left) has all wings folded, is fitted with a colony and devoid of legs, wings, head and



FOLLAND MIDGE (below), prototype of light-weight Coast fighter, was considered after of SBAC show (Aviation Week Sept. 30 p. 110). Speed at 600 mph. Wing-sweep +

British Show New Planes At Farnborough

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AVIATION WEEK - SEPTEMBER 27, 1984

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EDITORIAL

Persuading Motorists to Fly

Instead of trying merely to capture passengers from competing air carriers, Continental Air Lines is launching a campaign to divert motorists to the air.

Consider that thousands of auto miles can be converted to plane travel, especially between major distant points, the company will increase its advertising to extend the savings of an travel over the road.

"Twelve cents a mile AUTO or 6½ cents a mile AIR," is the theme. Copy will stress figures of cents per mile of operation for 15 leading makes of car drivers over 10,000 miles.

Since membership surveys conducted by some major auto have revealed high interest in the part of the public in information on motor cars and their costs, Continental may have a popular and effective car campaign.

Costs to be shown include the per-mile rate both to operate a car and to own a car, total costs per mile will be listed for a car bought with cash, and also for a car that is being financed. The average of 12 cents a mile results, excluding cost of meals, tips and hotels.

"Intercity traffic by auto is an unbalanced market for ready aider of air travel," Stanley Huffling, Continental vice president, believes.

Continental should also stress the vital basic element, with the distance differences in elapsed hours for car and air trips. Fatigue and comfort contrasts are worthy of attention. The auto's faults, few plus should be presented vigorously in the campaign, to answer the motorist's frequently expressed question that he can travel far faster in the car as much cheaper.

The railroads have complained bitterly, for years about what the competition of the motor has done to their business. But a few years before this, management thrust sufficiently to direct that advertising to drivers. While the speed differential between car and plane is greater than between car and train, and represents a serious threat to it, it is still gratifying to see an airline recognize a good market when it sees one.

Too much surface advertising is still uninteresting and undynamic, lacking the personal touch that tells the listener exactly what air transportation can mean to him. Continental's break direction of cars and their costs is taking popular language, and with something like \$6 million are spending, that is quite a sensible public!

Slow Down the Mails!

It seems a bit late, even for the subpost, but we expect it to happen. Seventy-five of their present cars are part of the government's use of the service for their-crit letter mail.

They propose a full-fledged investigation by the auto company swarms of lettercars are probably well known to citizens of many sections of the country. We hope there will be more. We know the lettercar will continue, with increasing frequency, to remind the world that aviation is not always a natural protector of human life. —Robert B. Wood

What is the basis for the complaint? Room service to the public? Hardly that! The complaint is that the railroads already have lost \$825,000 to the airlines on New York-Chicago three-cent mail traffic alone. They say extension of the service would "make more likely the loss permanently of revenues."

Of course, they are probably absolutely right. But they ignore the profound objective the Post Office Department had in mind when it launched this revenue-busting experiment: The government seeks to render the public a better mail service, and we are convinced that in this respect, at least, the experiment is an unqualified triumph. It seems exceedingly doubtful that the P.O. would jump into such a sweeping revision of traditional practice without first stretching the federal code!

And if we read our history books correctly, the railroads shucked little sympathy on the canal boats they suppressed. Neither did the public. This country's citizens will always demand improved services. If these are not the case, the canal boats would still be carrying the mails, freight and passengers.

The railroads appear much better off than the canal boats. They are, indeed, bound to be short-winded up in another five or ten years as far as long-haul passenger business is concerned, but they should continue to be with us for quite a time to handle our bulky, low-value freight shipments.

Helping Communities in Trouble

The remarkable abilities and record of the helicopter in saving human life is one of the noblest facets of aviation. These of us in the business new like this unique attribute of the helicopter in pretty much of a sophisticated, casual manner because already it's an old story—ours though's just.

Even so, all of us realize the chapter has only begun its career services in the world, and there are many brilliant achievements yet to be carried on in its world.

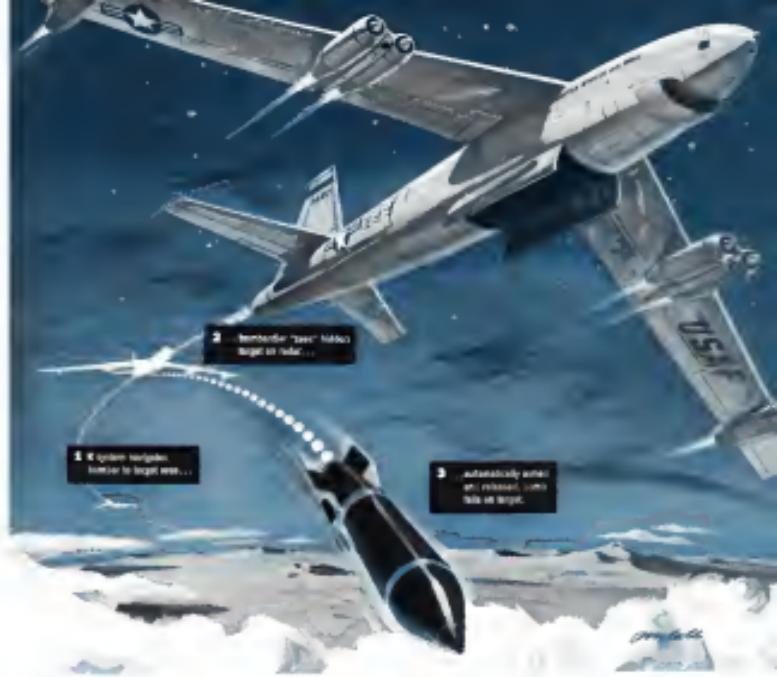
Ownership and operation of helicopter by police and other government services is becoming almost common. Sometime even municipality may own at least one.

In the meantime, however, it is a source of pride to us to ascertain that several aircarrier companies have offered their own helicopter to their communities in times of trouble.

Douglas Aircraft Co. has made its three-place Bell model available to Santa Monica police and fire department in time of emergency.

North American Aviation, which leases a Bell from a commercial operator, has used it on several occasions to assist Los Angeles County Sheriff's in rescuing children from drowning.

Other similar examples of fine civic service by auto company swarms of lettercars are probably well known to citizens of many sections of the country. We hope there will be more. We know the lettercar will continue, with increasing frequency, to remind the world that aviation is not always a natural protector of human life. —Robert B. Wood



USAF DESTROYS UNSEEN TARGETS; PLANES USE RADAR BOMBSIGHT

THE STORY BEHIND THE STORY

- You've read headlines like the one above, reporting the precision of Air Force bombing—during tests. Within hours after an airpower victory, you would read again—reporting deadly consequences. Night or day, regardless of weather, America can carry out its policy of instant retaliation to any aggression in any part of the world.
- Now at large-scale production, the Air

Force K-Bombing System combines automatic navigation with all-weather identification and bombing of any target with the aid of the Sperry Gyrojet's Flight Control and the K-Spanair, the crew that high-speed bomber to the target area. Using the Sperry-designed Bomber Control System, the bombardier uses the large radar screen at hand, by radar. The effects of speed, altitude and wind on the bombs are automatically computed, enabling the bombardier to score direct hits. In simplifying the complex job of bombing

at extreme altitudes from high speed, the K-System permits more time and flexibility for the bombardier to make certain of "mission completed."

• There's little resemblance between the automatic "bomber" and the first bombardier developed by Sperry for the World War II B-17 Flying Fortress, and the two were made possible because a mid-air delivery device—originally both were made possible because a mid-air delivery device—originated the need of instant delivery—than just there needs with a unique bombing program, which continues today with helping to generate a new global war.

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DIVISION OF THE SPERRY CORPORATION / AIRPORT CITY, NY

Where can you use this simple fastener?

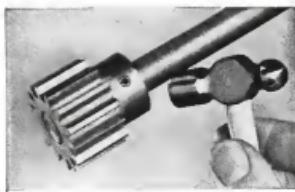


No threading, peening or precision
drilling with **ROLLPIN**

Rollpin is driven into holes
drilled to normal production-
line tolerances.



It compresses as driven.



Rollpin fits flush . . . is vibration-proof.

Rollpin is the slotted tubular steel pin with chamfered ends that is cutting production and maintenance costs in every class of industry.

This modern fastener drives easily into standard holes, compressing as driven. Its spring action locks it in place—regardless of impact loading, stress reversals or severe vibration. Rollpin is readily removable and can be re-used in the same hole.

* * *

If you use locating dowels, hinge pins, rivets, set screws—or straight, knurled, tapered or cotter type pins—Rollpin can cut your costs. Mail our coupon for design information.



ROLLPIN
TRADE MARK



TRADE MARK



a hinge pin



a set screw

Elastic Stop Nut Corporation of America
Dept. R16-925 Vauxhall Road, Union, N. J.

Please send me the following free fastening information:

Rollpin bulletin

Here is a drawing of our

Elastic Stop Nut bulletin

product. What fastener

would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____